



EMERGING ISSUES OF
HEALTH AND MORTALITY
IN THE ASIAN AND PACIFIC REGION

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Emerging Issues of Health and Mortality in the Asian and Pacific Region



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EMERGING ISSUES OF HEALTH AND MORTALITY IN THE ASIAN AND PACIFIC REGION

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PREFACE

This publication contains a selection of the papers that were presented at the Seminar on Emerging Issues of Health and Mortality, which was held at Bangkok from 27 to 29 September 2004. The papers provide both a broad view of the mortality situation in the region and country-specific profiles of various aspects of mortality. It is hoped that these will be of value in helping developing countries to further reduce mortality and improve the health of their populations in line with the Millennium Development Goals.

This publication was prepared by the Emerging Social Issues Division of ESCAP in cooperation with in-house experts and scholars in the region. Its production was made possible with the generous financial support of the United Nations Population Fund (UNFPA), which also funded the aforementioned Seminar under the project “Population, Development and Poverty: Emerging Challenges”.

While the availability of data and information on mortality varies from country to country, every effort was made to obtain the most reliable and up-to-date statistics available.

Overall, the publication shows that the Asian and Pacific region has experienced a remarkable increase in life expectancy at birth thanks to the many improvements in health-care services and socio-economic conditions during the past 50 years. Although the trend of falling mortality rates is clearly evident in the region as a whole, there is a large disparity in the health and mortality situation between subregions and even within countries.

This publication addresses such issues and emerging challenges by focusing on the relationship between health and mortality; infant, child and adult mortality (maternal mortality); shifts in age and disease patterns; and health-care systems and health care of older persons.

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Introduction –

Health and Mortality: Issues and Recommendations

ESCAP secretariat

The Asian and Pacific region has recorded a remarkable increase in life expectancy at birth in the last 50 years. Particularly in Asia in the period from 1950-1955 to 2000-2005, the average life expectancy soared from 41 years to 67 years. Infant mortality rates dropped from 182 to 53 per 1,000 live births during the same period. While the trend of falling mortality rates is a universal demographic feature across the Asian and Pacific region, there is nonetheless a large disparity in the health and mortality situations among countries, with some having continuously very high mortality rates, especially those for infant, child and maternal mortality. However, such countries tend to be in the earlier stages of development and thus are struggling to manage health-related mortality problems linked to poorer socio-economic conditions.

I. WHAT REDUCES MORTALITY RATES? – THE ONGOING DEBATES

The rise in life expectancy and concomitant decline in mortality levels in Asia and the Pacific are a reflection of a larger worldwide trend that has captured the interest of demographers. Numerous arguments have been put forth to explain the shift in demographic pattern. Living conditions were thought to be an important determinant of mortality rates, especially with higher levels of economic development achieved in the period from 1945 to 1980. In situations of dire poverty, measured in terms of income poverty and qualitative dimensions such as illiteracy, disease and hunger, mortality rates appear to be high. In addition, poverty, particularly income poverty, has been linked to poor living conditions and a lack of safe-drinking water supply, both of which have a detrimental effect on

health status. As such, there appears to be a bi-directional relationship between poverty and high mortality rates and high levels of economic advancement and GDP per capita and low mortality rates. Evidence from economically stable households reinforces this point, as such households tend to record lower rates of infant mortality.

While it has been unanimously agreed that eradicating poverty is a key factor in reducing mortality rates, there continues to be intense debate over whether mortality declines are inextricably linked to better nutrition and medical improvements in preventing premature death or whether government programmes play a central role in changing the health behaviour of individuals. However, demographers recognize that structural interventions may be only an “alternative” for better nutrition and improved health care. The example of Sri Lanka is a case in point. That country’s policy commitment to providing adequate and affordable health-care services for its people has been instrumental in improving health conditions, thereby reducing mortality levels. That policy intervention through government programmes is key to reducing mortality rates is also evidenced in the success that some countries such as Thailand and Cambodia have had in reducing HIV infection.

Yet another argument singles out the socio-economic status and educational level of women. These factors have also been heralded as critical in reducing mortality rates. While economic success may depend on educational attainment, the educational background of parents, especially mothers, together with living conditions, have been touted to be enabling conditions for increasing infant and child survival.

II. THE MILLENNIUM DEVELOPMENT GOALS: THE UNITED NATIONS RESPONSE

The persistent disparity in mortality levels across the world has moved the international community. In its urgency to improve human development by improving socio-economic conditions and raising living and health standards in the poorer countries in the world, the United Nations announced in September 2000 a new set of targets called the Millennium Development Goals (MDGs). These were adopted at the Millennium Summit where the international community pledged to meet the MDGs, each of which has targets to be achieved by 2015. Among these goals, which cover different areas of human development, only goals 4 and 5 explicitly address concerns of mortality. Specifically, goal 4 calls for a two thirds reduction in child mortality, while goal 5 has for its target a two thirds reduction in maternal mortality. Although goal 6, which is aimed at combating HIV/AIDS, malaria and other diseases, does not explicitly emphasize reducing mortality rates, it may be concluded that this goal has a similar aim since issues of health and mortality are closely interrelated. In contrast, the remaining five MDGs do not explicitly concern health and mortality issues. Nonetheless, evidence shows that eradicating extreme poverty and hunger, achieving universal primary education, promoting gender equality and empowering women also have the potential to improve health conditions and increase life expectancy, and thereby reduce mortality.

The collection of papers in this study examines precisely the ways in which health conditions have impacts on mortality. Drawing on data from various ESCAP countries, this study addresses the shift in age-specific and cause-specific mortality patterns. Specifically, the topics covered include the relationships among mortality, poverty, the environment and urbanization; infant, child and adult (maternal) mortality; changing mortality patterns and causes of death; changing lifestyles and emerging health threats; gender disparity in health and mortality; access to health-care services; and the health of and health-care services for older persons. In addition, this study focuses on the progress made by countries in the Asian and Pacific region in meeting the MDGs, and it lays out policy recommendations for further progress towards meeting the MDGs.

The chapters in this study were presented in the seminar on health and mortality organized by the ESCAP secretariat at Bangkok in September 2004. This study is organized to highlight four major issues: (a) the broader health and mortality issues and situations in the Asian and Pacific region and the challenges in reducing mortality levels; (b) infant, child and adult (maternal) mortality; (c) the shifts in age and disease patterns; and (d) health-care systems and the health of older persons.

A. Health and mortality: trends and challenges

The introductory chapter on “Health and Mortality: Situations and Challenges in the Asian and Pacific Region”, by Theresa W. Devasahayam, surveys the health and mortality trends in the ESCAP region, taking into account structural, environmental and social factors. Although the trend of increasing life expectancy for the last five decades is clearly evident in the region, large disparities in health and mortality conditions still exist between subregions as well as between and within individual countries. A distinct pattern emerges such that countries in the earlier stages of development are struggling to manage health-related mortality problems linked to poorer socio-economic conditions, while countries with more developed economies are facing a new set of challenges posed by emerging health threats stemming from environmental and lifestyle changes. In the former group of countries, infant, under-five, adult and maternal mortality rates tend to be high compared with countries having low mortality rates. While outlining the main causes of mortality across the region, the author also comments on various strategies that Governments should consider adopting in order to reduce mortality rates. In recognizing that the reduction of mortality involves a complex interaction of different factors, using United Nations estimates and projections from the period 1950-2010, the author emphasizes that the developmental stage into which a country falls is critical in determining the kind of policy intervention necessary to reduce mortality levels. While structural changes such as government intervention constitute the main strategy for reducing deaths in countries with higher mortality levels, the disease burden begins to shift to the individual in countries with low mortality.

Following this introductory chapter is another overview chapter covering many of the important issues concerning mortality and the current state of health conditions in the Asian and Pacific countries. In “Health Transition in Asia: Implications for Research and Health Policy”, Minja Kim Choe and Jiajian Chen note that in the past 50 years, life expectancy in Asian countries increased by an average of 20 years; however, in 2002, under-five mortality was still found to be high in many countries. A regression model identifies two factors that have statistically significant net effects on under-five mortality: GDP per capita and the percentage of one-year-olds who are vaccinated against measles. The model indicates that in order to achieve MDG goal 4, it is necessary for developing countries to have at least 90 per cent measles vaccination coverage and a GDP per capita of US\$ 1,000. However, the authors also make the counterpoint that infant mortality may be more effectively reduced through immunization programmes than by increasing per capita income, since it is more feasible to strengthen immunization programmes than to achieve economic targets. The authors also examine the epidemiological transition in Asia, identifying five key areas of research on health and mortality: (a) the effects of rapid economic development and social change on health risks; (b) the behavioural aspects of HIV epidemics in the Asian context; (c) the epidemiology of new infectious diseases such as SARS and avian influenza and the re-emergence of infectious diseases such as tuberculosis and malaria; (d) the health-care systems in different economic systems and levels of development; and (e) the financing of health-care costs for older persons.

Focusing on the countries and territories of the Pacific is Christine McMurray’s overview paper entitled “Morbidity and Mortality Patterns in the Pacific”. Essentially, the author reviews patterns and underlying causes of morbidity and mortality in that subregion, paying special attention to population and development, and health-service delivery factors. Her paper also focuses on the variation in health standards in 22 countries and territories of the Pacific subregion. Although most countries have experienced an increase in life expectancy in recent decades, the pattern of change has not followed the classic health transition model. Infectious diseases continue to be a major cause of morbidity and mortality while the Pacific is seeing simultaneously

the early onset of non-communicable diseases, especially diabetes mellitus. The emergence of such diseases tends to be directly related to lifestyle changes that occur with increasing involvement in the cash economy. This new epidemic increases the burden of disease, as measured by disability-adjusted life years and overall life expectancy. The result is that most Pacific island developing countries and territories exhibit a mixed pattern of morbidity and mortality, with variable proportions of infectious and non-infectious communicable diseases. Virtually all of them are currently experiencing slower rates of improvement in both adult and infant mortality than in the 1970s and 1980s, even though rates are still below developed country levels.

B. Infant, child and adult (maternal) mortality

This section of the study focuses on the age dimension of mortality. In the chapter entitled “Infant and Child Mortality in Urban Bangladesh: Are the Migrants and the Poor Disadvantaged?”, M. Mazharul Islam analyses the levels and trends of childhood mortality in urban Bangladesh, and examines whether children’s survival chances are reduced among the urban poor and rural-urban migrants. The author also points out that the urban-rural differentials in childhood mortality are diminishing gradually. Specifically, the findings indicate a declining trend in childhood mortality in both rural and urban Bangladesh, although the indices of infant and child mortality are consistently better in urban areas. The study identifies two distinct child mortality regimes in urban Bangladesh, one for urban natives and one for rural-urban migrants. Rural-to-urban migrants generally have higher childhood mortality levels than urban natives. Within urban areas, child survival status is even worse among the migrant poor than the average urban poor. In addition, the findings demonstrate that housing conditions and access to safe drinking water and hygienic toilet facilities are the most critical determinants of child survival in urban areas, even after controlling for migration status. In conclusion, the author points out that efforts to improve child health in urban Bangladesh should focus on the urban poor and urban migrants, who are growing more rapidly than the rural poor owing to heavy rural-to-urban migration.

Focusing on Sri Lanka's achievements in reducing maternal and adult mortality, the chapter entitled "Maternal and Adult Mortality in Sri Lanka" by A.T.P.L. Abeykoon highlights the major causes of that country's marked decline in maternal and adult mortality trends over the last five decades. In the South Asian context, Sri Lanka's achievements in reducing maternal and adult mortality are unique. The country has already reached low levels of mortality. Social development policies pursued for over six decades, particularly in the fields of health and education, have contributed to the country's low mortality situation. Life expectancy at birth for males and females, which was 46.8 and 44.7 years in 1946, increased to 70.7 and 75.9 years respectively by 1995. The adult mortality rates have continued to decrease over this period with female rates decreasing at a faster rate than those of males. The maternal mortality ratio has declined from 1,610 maternal deaths per 100,000 live births in 1940 to 25 in 1995. However, in recent decades suicide and induced abortion have emerged as important factors contributing to adult and maternal mortality. Further reductions in maternal and adult mortality are possible through targeted interventions such as improved maternal nutrition, detection and treatment of major diseases that cause maternal and adult mortality. Sri Lanka's current strategies aimed at improving antenatal and postnatal care, safe delivery, emergency obstetric care and family planning are expected to enable it to meet the MDG for maternal mortality.

The chapter dealing with maternal mortality is entitled "Challenges in Addressing Safe-Motherhood Issues in Indonesia". In this chapter, author Budi Utomo examines the mortality situation of Indonesia, especially the programmes started as early as the 1950s that address the issue of the health of mothers and children. Following the 1987 Nairobi Safe Motherhood Initiative, the Government of Indonesia adopted various measures to address safe-motherhood issues since maternal mortality was significantly high in that country. This chapter also reviews the causes of maternal mortality, including safe-motherhood policies and programmes. It highlights the complexities of safe-motherhood issues in Indonesia, as services and care during pregnancy and delivery continue to be inadequate, and referrals and emergency obstetric care are still delayed owing to a combination of factors. Contextual factors such as the low status of women, poverty, community beliefs and behaviours,

and decentralization have adversely affected access to good quality family planning and obstetric care, especially among poor women. As a result, maternal mortality remains high. While the Government's commitment to address safe-motherhood issues is strong, the downside is that it has not yet been appropriately translated into operations at the service and community levels.

C. Shifts in age and disease patterns

Because people live longer, disability from disease shifts according to age cohorts. People tend to suffer from a greater number of diseases as they get older, although this trend differs depending on the socio-economic conditions of a population. In the chapter entitled "Achieving the MDGs: Health and Mortality Trends in Malaysia", Chee Heng Leng addresses the progress attained in achieving the two MDGs concerning child and maternal mortality, the rates of which tend to be uneven throughout the developing world. Even within a "successful" country, there are often wide disparities, with some social groups being left behind. In general, East and South-East Asia are areas in which progress in attaining the MDGs is thought to be on track. This paper reviews the achievements of Malaysia with regard to the two previously mentioned MDGs. However, while overall national achievement has been good, there are particular social groups and geographical areas where progress towards attaining the health-related goals of the MDGs has proven to be slower. Childhood undernutrition and maternal health problems such as anaemia are prevalent in some rural areas and among indigenous communities, with Sabah State consistently having poor indicators. In addition, infectious diseases such as malaria, HIV/AIDS and tuberculosis have either emerged or re-emerged as major problems in certain states and localities. Further research is needed to understand the reasons for the relatively high infant mortality rate in the rural Sabah State, as well as the persistence of maternal and child health problems among indigenous groups, particularly those affected by logging and land-clearing. The unexpected high rates of infant mortality in metropolitan Kuala Lumpur also call for closer investigation. Another area that demands greater research attention is the health of migrant workers whose numbers are ever increasing. In light of the perception among health workers that the upsurge in infectious diseases is due to transnational migrant labour, the dearth of research

on migrant health is surprising. With the number of HIV infections growing, the author emphasizes that more effective action is urgently needed to curb the rise in the spread of HIV. To this end, there is a need to examine the infectious disease situation in a holistic manner, in the context of economic development, movement of people and environmental changes, as well as in light of the political, economic and social pressures that are brought to bear on social groups.

The topic of age-specific mortality is taken up by Mohammad Jalal Abbasi-Shavazi and his co-authors in the chapter entitled “Trends and Emerging Issues of Health and Mortality in the Islamic Republic of Iran”. The results of their study show that the Islamic Republic of Iran has experienced a phenomenal mortality decline made evident by the fact that life expectancy at birth has increased and the infant mortality rate has declined considerably. That decline has been substantial during the last two decades, thanks to the improvement of the health network system and rural development in the post-revolutionary period. There has also been a shift from infectious diseases to non-communicable diseases. Cardiovascular diseases, accidents and various types of cancer are currently the main causes of death. The paper recommends that the Government should adopt appropriate strategies to reduce the number of deaths from these causes. Monitoring the health of older persons as well as behavioural changes including diet and exercise should be the prime strategies in the reduction of cardiovascular diseases. Given the country’s population age structure, policies aimed at reducing traffic accidents among young people would contribute to a further fall in mortality. Adolescent reproductive health is an important issue which deserves the attention of policy makers. Because few studies have examined the situation of health, morbidity and causes of death in the country, further studies are needed to deepen the understanding of the mortality transition in the Islamic Republic of Iran.

D. Health-care systems and health care of older persons

Forming the last section of this study are three chapters delving into the health and mortality issues of older populations within the Asian and Pacific region. In the chapter entitled “A Comparison of Self-Assessed Health Expectancy among

Older Adults in Several Asian Settings”, Mary Beth Ofstedal and her co-authors present estimated self-assessed health expectancies at age 60 years and older for China, Indonesia, the Philippines, Singapore and Thailand. One outstanding feature of these countries is their rapidly ageing populations and the socio-economic changes felt as a result of this demographic shift. As such, the policy makers of these countries have become concerned about the potential implications for the future disease burden and the associated informal and formal demands for health care. While noting that most studies on health expectancy have been conducted in the West, research on this topic has only recently gained attention in the less developed regions of the world. Nonetheless, in their investigation the authors found that Asian societies generally follow the age and gender patterns of self-assessed health expectancy found in Western societies. They also found that women spent a larger proportion of their old age in poor health compared with men, although older women tend to live longer than men. In conclusion, the authors maintain that health expectancy analysis is particularly important in rapidly ageing societies, since it is valuable for estimating the potential demand for health-care services and the long-term care needs of the older population by providing estimates of the years that individuals can expect to spend in healthy and unhealthy states.

Yoshie Moriki-Durand’s chapter, entitled “Health Status of Older Thais: Current Situation, Problems and Policy Implications”, highlights the rapid pace of population ageing in Thailand and its socio-political ramifications. Owing to the increase in the size of the population of older persons, the quality of life in later years has emerged as a concern. Moreover, the author states that, although people in Thailand are living longer, this does not necessarily mean that they are living healthier lives. As the debate over the relationship between the prolonged part of the life and health status suggests, growth in the size of the older segment of the population is often associated with increased incidence of chronic diseases and higher prevalence of disabilities. Hence, she emphasizes that an examination of the current disability status and prevalence of chronic diseases among older persons in Thailand is necessary for two reasons: first, to prepare society for the expected growth in the size of the older population and, second, to develop strategies to improve the health status of older persons in order to ensure adequate levels of well-being.

III. STRATEGIES TO ACHIEVE THE MILLENNIUM DEVELOPMENT GOALS

Aside from providing a comprehensive overview of the trends and emerging issues on health and mortality in Asia and the Pacific, the discussions that emerged in the seminar also included a list of recommendations. Governments and non-governmental organizations may find these recommendations, which support the objectives of achieving the Millennium Development Goals, useful as guidelines in the formulation of policies and the implementation of programmes in order to improve health and reduce mortality.

A. General recommendations

1. Governments need to strengthen policies to expand and enhance primary health-care services.
2. Disparities exist in health status among different groups of people in some countries, despite the efforts made by Governments. Health-care services should be targeted at groups that are disadvantaged geographically and socio-economically so as to improve their access to good quality health-care services.
3. Governments should facilitate equity in access to health care, by introducing advanced technology and ensuring access to specialized health personnel and hospitals when needed, among other measures.
4. Governments should promote and build on the growing community awareness of healthy lifestyles.
5. Health-care systems should take into account emerging health problems related to infectious diseases as a result of increasing population movements and international trade.
6. Greater emphasis should be placed on sector-wide interventions and partnerships to link health with initiatives in reducing poverty and improving living standards.

7. The particularities of local communities should be taken into account by Governments and donors and specific needs should be identified, making full use of the data collected in the recipient countries.

B. Maternal and child health

8. Governments should link strategies to improve health and vital registration data with strategies to extend maternal and child health services.
9. Governments need to strengthen immunization programmes, and antenatal and post-natal care as an immediate action to reduce under-five mortality. These programmes have been found to be cost-effective in many countries.
10. Evidence shows that in some countries the disadvantages faced by female children continue into adulthood, thereby shortening the life expectancy of women. Efforts should be made to improve the social environment to enhance the survival conditions of female children.
11. A gender perspective should be incorporated into all development programmes, including health programmes, to improve the status of women, as this would help reduce maternal mortality.
12. National efforts to improve the health-care system, ensure adequate nutrition of pregnant and breastfeeding mothers, and improve basic sanitary conditions should be strengthened, particularly in countries with high mortality levels.
13. In reducing maternal mortality, Governments should ensure universal access to 24-hour good quality essential and emergency obstetric services.
14. Giving all women access to reproductive health services should be a priority in order to reduce unwanted pregnancies.

15. It is important for Governments to address the issue of unsafe abortion while taking into account the fact that abortion is a complex health and social issue involving controversial, legal, moral, religious and ethical dimensions.
16. Adolescents are increasingly the victims of unwanted pregnancies and sexually transmitted infections. Governments should prioritize the protection and care of adolescents in view of the reproductive health risks they face.
17. Governments should ensure that appropriate and sufficient legislation is in place to protect women and children from abuses and exploitation. It is also necessary to work towards the removal of any constraints that could prevent legislation that would combat such ills from being enforced.
22. Governments should ensure that caregivers for older persons are well supported.
23. Policies should be formulated and programmes implemented to ensure older persons' social participation and decent living conditions, taking into account their differing degrees of functional limitations. Governments should implement programmes to bring about the required changes needed in older persons' homes and in public spaces in order to enable older persons to remain mobile.
24. The health status of older persons should be regularly monitored.
25. Governments should implement programmes to increase the social integration of older persons within family units (for example, through public education on the ageing process and the promotion of intergenerational activities) and within society (for example, through part-time work and volunteer programmes).

C. Health of older persons

18. Health policies and programmes need to be increasingly responsive to persistent and emerging health risks of older persons, such as chronic diseases and disabilities in older persons in the age group 85 years and older.
19. In order to reduce health-care costs resulting from the rising number of older persons in the population, Governments should implement programmes to encourage active and healthy lifestyles of individuals among the different age groups.
20. Governments should formulate policies and implement programmes to improve the health of older women who tend to live less healthy lives and are less likely than men to be financially resourceful. These policies should be sensitive to cultures in certain societies in order to maximize the effectiveness of health services and health-care utilization.
21. Governments should implement programmes to provide medical care to older adults who have inadequate resources, in particular those persons without families.
26. Priority should be given to developing measures to prevent or mitigate the consequences of non-fatal yet disabling chronic diseases by providing facilities for the rehabilitation of long-term disabled persons.
27. Governments should explore ways to secure a source of physical and emotional care for unmarried and widowed older persons whose proportion in the population is rising.

D. Causes of death

28. Governments should continue to control infectious diseases as studies have found that they will continue to be a major cause of death in some countries for future generations.
29. Governments should take appropriate actions to reduce the number of deaths due to non-communicable diseases, which are becoming major causes of death in many countries.

30. There is an urgent need for greater political commitment in order to control the spread of HIV/AIDS. Positive attitudes towards and supportive environments for people living with HIV/AIDS should be encouraged.
31. Governments should enhance mental health programmes and counselling programmes.
32. The prevention of non-communicable diseases such as cardiovascular diseases, cancers and injuries should focus on behavioural risk factors in an integrated manner as they share the same preventable lifestyle risk factors. Attention should also be given to structural factors and to the creation of enabling conditions for healthy lifestyles.
33. Governments should focus on the identification of risk factors for non-communicable diseases among children in order to effectively reduce mortality.
34. More resources should be allocated to the surveillance of health patterns and the identification of emerging diseases.
35. Governments should take appropriate actions to reduce the number of accidents, especially among young people, and to increase public awareness of safety issues and surveillance.
36. Governments should implement programmes directed towards the general public and industries to reduce the incidence of tobacco use.
37. Governments should ensure healthy living conditions by preventing environmental degradation.
38. Systematic data on health and mortality should be gathered in order to improve national health policies. The accuracy of existing mortality data should be carefully evaluated before conclusions are drawn and policies formulated.
39. Research should be carried out to examine the relationship between rapid economic changes and associated health risks.
40. Studies based on multiple methods, including the self-assessment of health status in older populations, should be undertaken to provide additional information and help to identify the potential demand for health services and long-term care for older persons.
41. More efforts should be made to standardize health indicators in order to enhance comparability across time and place when collecting longitudinal data.
42. Further research should be conducted on the health situation and access to health-care services for migrant and displaced populations.
43. Studies should be carried out and policies implemented on the environmental causes of death and disease.
44. More research should be carried out to examine the spread of HIV/AIDS, malaria, tuberculosis and other infectious diseases in the context of economic development, environmental change and the movement of people.
45. Despite the general improvement in health and a gradual reduction in mortality rates, further studies of the causes of death are needed in order to deepen the understanding of the mortality transition. This will help in the design of appropriate and effective programmes.
46. Concerted efforts should be made to disseminate research findings to policy makers and the general public.

E. Future research

38. Systematic data on health and mortality should be gathered in order to improve national health policies. The accuracy of

PART ONE

Health and Mortality: Trends and Challenges

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Chapter I

Health and Mortality: Situations and Challenges in Asia and the Pacific

*Theresa W. Devasahayam**

The most striking demographic phenomenon of the twentieth century was a marked decline in mortality rates accompanied by a dramatic rise in life expectancy, specifically among countries in the developed regions of the world. This decline was most pronounced in the 1960s, leading demographers to coin the term “mortality transition”. The term describes essentially a state of high mortality, resulting from the high incidence of infectious and parasitic diseases followed by a state of lower mortality, resulting from the successful control of communicable diseases (Santow, 1999, p. 40). However, the mortality transition also suggests an epidemiological transition with the burden of disease shifting from the “age of pestilence and famine” to the “age of degenerative and man-made diseases” (Omran, 1971, p. 517, as cited in Santow, 1999, p. 40). Underlying this demographic shift is the question of what constitutes the actual determinants of health in terms of structural, environmental and social factors that have led to the lower incidence of ill health and higher levels of survival into old age, otherwise known as “the health transition” (see also Caldwell, 1996b, p. 356, as cited in Santow, 1999, p. 41).

Over the last five decades, the Asian and Pacific region, following global trends, has experienced a remarkable increase in the expectation of life at birth from 41 years in the period 1950-1955 to 67 years in the period 2000-2005. More generally, advances in health-care services and socio-economic conditions have contributed to the decline in mortality rates. Although this trend is clearly

evident in the Asian and Pacific region, there still exists a large disparity in health and mortality conditions between subregions as well as countries. A distinct pattern emerges with countries in the earlier stages of development struggling to manage health-related mortality problems linked to poorer socio-economic conditions, while countries with more developed economies have to face a new set of challenges posed by emerging health threats stemming from environmental and lifestyle changes.

This overview paper investigates the relationship between health and mortality trends, taking into account structural, environmental and social factors across the Asian and Pacific region. The first half of the discussion presents a comparison of how the ESCAP region fares in contrast to other regions of the world, as well as how countries in the ESCAP region compare with each other. Here, attention is focused on infant, child (or under-five), adult and maternal mortality as indicators of health status. For each of these indicators, countries in the Asian and Pacific region are categorized into high-, intermediate- and low-mortality countries, demonstrating that mortality trends are uneven. Mortality trends also vary with respect to sex and age. The second half of the paper deals with the substantive issues related to how health is linked to mortality, specifically identifying the main causes of high, intermediate and low mortality trends. Given the unevenness in mortality trends across the ESCAP region, it is the developmental stage into which a country falls that would eventually determine the kind of policy intervention adopted by the Government. While structural changes such as government intervention constitute the main strategy for reducing mortality in countries with high and intermediate levels, the disease burden begins to shift to the individual in countries with low mortality levels.

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I. WHAT AND WHERE ARE THE DEMOGRAPHIC SHIFTS IN THE ESCAP REGION?

A. Infant mortality: major trends

It is a well-established fact that significant reductions in infant mortality rates have been achieved because of the successful immunization programmes for measles, diphtheria, pertussis (whooping cough), tetanus and tuberculosis (Santow, 1999, p. 39). As in much of the rest of the world, infant mortality has been steadily declining in the ESCAP region. In comparison to the other major regions, rates in Asia are only slightly lower than the world average owing to the fact that infant mortality in south-central Asia is still relatively high (table 1). If not for the Oceania rate, which is less than half of the world average because of the higher levels of socio-economic development of countries such as Australia and New Zealand, infant

mortality rates would have been slightly higher for the region than the actual figures. Nonetheless, a hopeful trend is that since 1980, rates in the subregions of Asia (except for western Asia) and Oceania have been found to be dropping at a faster pace than in Africa, and Latin America and the Caribbean.

During the past two decades, there has been a considerable decline in the infant mortality rate in the Asian and Pacific region. However, this decline has been uneven. United Nations estimates for 2000-2005 indicate that 19 countries have low levels of infant mortality (less than 25 per 1,000 live births), which is almost double the number of countries with low rates in the period 1980-1985 (table 2). By and large, countries with lower levels of infant mortality are those that have put public health measures in place to combat infectious diseases (cf. Santow, 1999, p. 48). Yet, countries with moderate (25-49 per 1,000) and high (50-99 per 1,000) levels of infant mortality continue to outnumber those that have been successful in lowering their rates to below 25 per 1,000, indicating that many countries have yet to provide an adequate health-care system to check the spread of infectious diseases, especially among their infant population. As for countries that have previously had very high levels of infant mortality, a promising trend has been recorded. In the period 1980-1985, 10 countries, mostly from the subregions of southern Asia and south-east Asia, had infant mortality rates of more than 100 per 1,000. By the period 2000-2005, only two countries, that is, Afghanistan and Timor-Leste, recorded such high infant mortality rates, suggesting that countries with previously high infant mortality rates have joined those with moderately high rates, resulting in a growing number of the latter group of countries since the period 1980-1985.

Table 1. Infant mortality rate, by major regions of the world

(per 1,000 live births)

Region	1980-1985	1990-1995	2000-2005
World	78	64	56
Africa	113	99	89
Europe	18	12	9
Asia	82	65	53
Eastern Asia	48	43	34
South-central Asia	107	82	68
South-eastern Asia	79	55	41
Western Asia	72	56	44
Northern America	11	8	7
Latin America and the Caribbean	57	40	32
Oceania	37	31	26

Source: United Nations (2003). *World Population Prospects: The 2002 Revision, Vol. 1, Comprehensive Tables* (United Nations publication, Sales No. E. 03.XIII.6).

Note: The following are included in the "eastern Asia" subregion: China; Hong Kong, China; Democratic People's Republic of Korea; Japan; Macau; Mongolia; Republic of Korea. The "south-central Asia" subregion: Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Kazakhstan, Kyrgyzstan, Maldives, Nepal, Pakistan, Sri Lanka, Tajikistan, Turkmenistan; Uzbekistan. The "south-eastern Asia" subregion: Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste; Vietnam. The "western Asia" subregion: Armenia, Azerbaijan, Bahrain, Cyprus, Gaza Strip, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Turkey, United Arab Emirates, Yemen.

Another uneven trend is that declines in infant mortality rates have been faster in some countries than others. While many ESCAP countries and territories have been able to reduce their infant mortality rates by at least 50 per cent, a few others such as the Islamic Republic of Iran, Malaysia, Singapore, Guam, New Caledonia, French Polynesia and the Republic of Korea have recorded reductions of at least 60 per cent (table 3). Interestingly, some countries showed an increase in infant mortality during this period. Kazakhstan and the Democratic People's Republic of Korea recorded infant mortality rates that increased by 30 and 61 per cent respectively.

Table 2. Infant mortality rates in the ESCAP region

<i>Country, territory or area</i>		<i>1980-1985</i>	<i>Country, territory or area</i>	<i>2000-2005</i>
Low (less than 25 per 1,000)	Japan	6.5	Singapore	2.9
	Singapore	8.4	Japan	3.2
	Hong Kong	9.6	Hong Kong, China	4.1
	Australia	10.0	Republic of Korea	5.0
	New Zealand	11.9	Australia	5.5
	Brunei Darussalam	14.0	New Zealand	5.8
	Macao	16.0	Brunei Darussalam	6.1
	New Caledonia	21.0	New Caledonia	6.6
	Armenia	22.0	Macao, China	8.6
Moderate (25 to 49 per 1,000)	Republic of Korea	23.0	French Polynesia	8.7
	Russian Federation ^a	26.0	Guam	9.8
	Malaysia	28.0	Malaysia	10.1
	Democratic People's Republic of Korea	28.0	Russian Federation	15.9
	Guam	28.5	Armenia	17.3
	French Polynesia	30.0	Georgia	17.6
	Georgia	31.9	Fiji	17.8
	Sri Lanka	35.7	Thailand	19.8
	Solomon Islands	38.0	Sri Lanka	20.1
	Azerbaijan	39.0	Solomon Islands	20.7
	Kazakhstan	39.8	Samoa	26.1
	Fiji	40.1	Vanuatu	28.5
	Micronesia, Federated States of	47.1	Philippines	29.0
	Tonga	47.1	Azerbaijan	29.3
	Thailand	47.2	Iran (Islamic Republic of)	33.3
High (50 to 99 per 1,000)	Kyrgyzstan	51.0	Viet Nam	33.6
	Samoa	51.6	Micronesia, Federated States of	33.9
	China	52.0	Tonga	33.9
	Turkmenistan	60.0	China	36.6
	Philippines	61.2	Uzbekistan	36.7
	Uzbekistan	63.7	Kyrgyzstan	37.0
	Tajikistan	65.0	Maldives	38.3
	Vanuatu	70.0	Turkey	39.5
	Viet Nam	70.4	Indonesia	41.6
	Mongolia	77.9	Democratic People's Republic of Korea	45.1
	Turkey	82.5	Turkmenistan	48.6
	Iran (Islamic Republic of)	88.1	Tajikistan	50.0
	Indonesia	88.8	Kazakhstan	51.7
	Papua New Guinea	91.2	Bhutan	53.6
	Maldives	93.6	Mongolia	58.2
Very high (100 or more per 1,000)	India	106.1	Papua New Guinea	62.1
	Cambodia	109.7	Bangladesh	64.0
	Myanmar	111.2	India	64.5
	Bhutan	118.4	Nepal	70.9
	Bangladesh	120.4	Cambodia	73.2
	Pakistan	122.8	Myanmar	83.5
	Nepal	125.5	Pakistan	86.5
	Lao People's Democratic Republic	128.0	Lao People's Democratic Republic	88.0
	Afghanistan	177.0	Timor-Leste	123.7
	Timor-Leste	183.3	Afghanistan	161.7

Source: United Nations (2003). *World Population Prospects: The 2002 Revision, Vol. 1, Comprehensive Tables* (United Nations publication, Sales No. E. 03.XIII.6).

^a This refers to the part of the former Union of Soviet Socialist Republics that corresponds to the Russian Federation of today.

Table 3. Percentage decline in infant mortality rate in the ESCAP region during the periods 1980-1985 and 2000-2005

Country, territory or area	Infant mortality rate (per 1,000 live births)		Percentage decline
	1980-1985	2000-2005	
Republic of Korea	23.0	5.0	-78.1
French Polynesia	30.0	8.7	-70.9
New Caledonia	21.0	6.6	-68.5
Guam	28.5	9.8	-65.7
Singapore	8.4	2.9	-64.8
Malaysia	28.0	10.1	-64.1
Iran (Islamic Republic of)	88.1	33.3	-62.2
Vanuatu	70.0	28.5	-59.2
Maldives	93.6	38.3	-59.1
Thailand	47.2	19.8	-58.1
Hong Kong, China	9.6	4.1	-57.5
Brunei Darussalam	14.0	6.1	-56.6
Fiji	40.1	17.8	-55.7
Bhutan	118.4	53.6	-54.7
Indonesia	88.8	41.6	-53.1
Philippines	61.2	29.0	-52.6
Viet Nam	70.4	33.6	-52.3
Turkey	82.5	39.5	-52.1
New Zealand	11.9	5.8	-50.9
Japan	6.5	3.2	-50.4
Samoa	51.6	26.1	-49.5
Bangladesh	120.4	64.0	-46.8
Macao, China	16.0	8.6	-46.4
Solomon Islands	38.0	20.7	-45.5
Australia	10.0	5.5	-45.0
Georgia	31.9	17.6	-44.8
Sri Lanka	35.7	20.1	-43.7
Nepal	125.5	70.9	-43.5
Uzbekistan	63.7	36.7	-42.4
India	106.1	64.5	-39.2
Russian Federation ^a	26.0	15.9	-38.8
Cambodia	109.7	73.2	-33.2
Timor-Leste	183.3	123.7	-32.5
Papua New Guinea	91.2	62.1	-31.9
Lao People's Democratic Republic	128.0	88.0	-31.3
China	52.0	36.6	-29.6
Pakistan	122.8	86.5	-29.5
Micronesia, Federated States of	47.1	33.9	-27.9
Tonga	47.1	33.9	-27.9
Kyrgyzstan	51.0	37.0	-27.3
Mongolia	77.9	58.2	-25.3
Myanmar	111.2	83.5	-24.9
Azerbaijan	39.0	29.3	-24.8
Tajikistan	65.0	50.0	-23.1
Armenia	22.0	17.3	-21.2
Turkmenistan	60.0	48.6	-19.0
Afghanistan	177.0	161.7	- 8.6
Kazakhstan	39.8	51.7	30.0
Democratic People's Republic of Korea	28.0	45.1	61.0

Source: United Nations (2003). *World Population Prospects: The 2002 Revision, Vol. 1, Comprehensive Tables* (United Nations publication, Sales No. E. 03.XIII.6).

^a For the period 1980-1985, this refers to the part of the former Union of Soviet Socialist Republics that corresponds to the Russian Federation of today.

B. Under-five mortality: major trends

As with infant mortality, under-five (or child) mortality rates have improved over the last decade.

In the period 1990-1995, 14 countries or areas had child mortality rates of 25 per 1,000 or lower, while in the period 2000-2005 four more countries were added to the list (see table 4). In the period 2000-

Table 4. Under-five mortality rate in the ESCAP region for both sexes combined

<i>Country, territory or area</i>		<i>1990-1995</i>	<i>Country, territory or area</i>	<i>2000-2005</i>
Low (≤25 per 1,000)	Hong Kong, China	6.1	Singapore	4.0
	Japan	6.3	Japan	4.4
	Singapore	7.3	Hong Kong, China	5.2
	Australia	8.0	Australia	6.7
	New Zealand	9.3	Republic of Korea	7.1
	Brunei Darussalam	9.3	New Zealand	7.3
	Macao, China	10.9	Brunei Darussalam	7.4
	Guam	14.4	Macao, China	9.5
	French Polynesia	14.6	New Caledonia	9.5
	Republic of Korea	17.0	Guam	11.3
	New Caledonia	17.1	French Polynesia	11.4
	Malaysia	19.8	Malaysia	13.0
	Georgia	23.6	Armenia	19.8
	Armenia	25.0	Russian Federation	20.8
Moderate (26-49 per 1,000)	Russian Federation	27.9	Georgia	21.8
	Sri Lanka	31.8	Fiji	22.0
	Democratic People's Republic of Korea	34.0	Sri Lanka	23.4
	Thailand	37.7	Thailand	24.9
	Fiji	43.6	Solomon Islands	30.4
	Solomon Islands	44.4	Samoa	31.5
	Samoa	45.3	Vanuatu	34.9
	Vanuatu	47.9	Philippines	35.0
	Azerbaijan	49.9	Iran (Islamic Republic of)	38.8
	Kyrgyzstan	50.8	Azerbaijan	40.0
High (50-99 per 1,000)	Philippines	53.7	Micronesia, Federated States of	41.9
	Micronesia, Federated States of	53.8	Tonga	41.9
	Tonga	53.9	China	42.7
	China	55.5	Viet Nam	44.8
	Uzbekistan	62.6	Kyrgyzstan	46.0
	Kazakhstan	62.6	Maldives	48.6
	Iran (Islamic Republic of)	62.7	Turkey	49.5
	Viet Nam	68.9	Uzbekistan	51.8
	Turkey	73.8	Indonesia	52.3
	Maldives	76.2	Kazakhstan	58.1
	Turkmenistan	77.4	Democratic People's Republic of Korea	58.4
	Indonesia	78.7	Turkmenistan	67.7
	Tajikistan	80.3	Tajikistan	72.6
	Mongolia	103.1	Bhutan	80.0
Very high (100 ≥ per 1,000)	Papua New Guinea	107.2	India	84.0
	India	110.3	Papua New Guinea	84.5
	Bhutan	116.7	Mongolia	85.5
	Bangladesh	128.1	Bangladesh	87.4
	Cambodia	134.5	Nepal	98.4
	Nepal	138.5	Cambodia	107.1
	Myanmar	151.4	Myanmar	127.7
	Pakistan	159.8	Pakistan	127.8
	Lao People's Democratic Republic	170.5	Lao People's Democratic Republic	140.6
	Timor-Leste	224.4	Timor-Leste	182.6
	Afghanistan	291.6	Afghanistan	280.2

Source: United Nations (2003). *World Population Prospects: The 2002 Revision, Vol. 1, Comprehensive Tables* (United Nations publication, Sales No. E.03.XIII.6).

2005, 13 countries recorded moderate levels of child mortality as compared with 9 countries in the period 1990-1995. The increase in number of countries or areas joining those with moderate levels of child mortality reflects a positive trend, since nine of these countries were in the high mortality category in the period 1990-1995. In addition, the number of countries with very high child mortality rates has decreased from 12 in the period 1990-1995 to 6 in the period 2000-2005. Apart from the recently war-torn countries, others in the very high category are Cambodia, the Lao People's Democratic Republic, Myanmar and Pakistan.

Many countries in South Asia are making serious efforts to reduce child mortality rates. In South Asian countries, cultural factors play a significant role with regard to sex differentials in child mortality rates. In parts of northwestern India, preferential treatment for boys has resulted in discrepancies in child mortality rates with the girl child experiencing a 40 per cent higher probability of dying before reaching the fifth birthday than a boy child (Victora, 2003, p. 235; cf. Wadley, 1993). A similar discriminatory practice is found in Nepal

where child mortality among girls is said to be 22 per cent higher than among boys (Luther, Thapa and Westley, 1999, p. 3). The higher child mortality rate among girls is due to the fact that boys are given preferential treatment in terms of nutrition and health care. No urgency is felt when a girl child falls ill unless her condition is in the more advanced stages of illness. Mortality rates for females are also higher because girls are often brought to less qualified doctors by parents who are not willing to spend what they would on boys (Victora, 2003, p. 235).

Although improvements in child mortality levels have been demonstrated across the ESCAP region, in terms of the Millennium Development Goals adopted by the United Nations in September 2000, projected estimates show that only the Republic of Korea will be able to achieve the goal of reducing its child mortality rate by two thirds, while the majority of countries are falling behind (table 5). A promising trend, however, is that there are 12 countries that are projected to achieve a more than 50 per cent decline: Bangladesh, Bhutan, Fiji, Indonesia, the Islamic Republic of

Table 5. Trends in under-five mortality rate in the ESCAP region

Country, territory or area	Under-five mortality (per 1,000 live births)			Percentage decline 1990-1995 to 2000-2005	Country, territory or area	Projected percentage decline 1990-1995 to 2010-2015
	1990-1995	2000-2005	2010-2015			
East and North-East Asia						
China	55.5	42.7	34.1	-23.1	Republic of Korea	-68.9
Democratic People's Republic of Korea	34.0	58.4	44.5	71.6	Maldives	-59.3
Hong Kong, China	6.1	5.2	4.9	-15.8	Fiji	-58.8
Japan	6.3	4.4	4.1	-29.4	Iran (Islamic Republic of)	-57.7
Macao, China	10.9	9.5	8.0	-13.2	Indonesia	-55.2
Mongolia	103.1	85.5	62.8	-17.1	Philippines	-54.7
Republic of Korea	17.0	7.1	5.3	-58.1	Viet Nam	-54.1
South-East Asia						
Brunei Darussalam	9.3	7.4	6.6	-20.6	Bhutan	-54.0
Cambodia	134.5	107.1	78.7	-20.4	Turkey	-53.8
Indonesia	78.7	52.3	35.2	-33.5	Nepal	-52.8
Lao People's Democratic Republic	170.5	140.6	107.9	-17.5	Bangladesh	-52.7
Malaysia	19.8	13.0	10.3	-34.4	New Caledonia	-52.2
Myanmar	151.4	127.7	102.9	-15.6	Thailand	-51.6
Philippines	53.7	35.0	24.3	-34.9	Solomon Islands	-49.1
Singapore	7.3	4.0	4.1	-45.9	Malaysia	-48.1
Thailand	37.7	24.9	18.3	-34.1	Samoa	-47.9
Timor-Leste	224.4	182.6	143.3	-18.6	Sri Lanka	-44.0
Viet Nam	68.9	44.8	31.6	-35.0	Singapore	-43.9
					Tonga	-43.7
					Micronesia, Federated States of	-43.7
<i>(Continued)</i>						

(Continued)

Table 5 (Continued)

Country, territory or area	Under-five mortality (per 1,000 live births)			Percentage decline 1990-1995 to 2000-2005	Country, territory or area	Projected percentage decline 1990-1995 to 2010-2015
	1990-1995	2000-2005	2010-2015			
South and South-West Asia					Vanuatu	-43.7
Afghanistan	291.6	280.2	240.7	-3.9	India	-42.6
Bangladesh	128.1	87.4	60.5	-31.8	Cambodia	-41.5
Bhutan	116.7	80.0	53.7	-31.5	Papua New Guinea	-39.9
India	110.3	84.0	63.3	-23.8	Mongolia	-39.1
Iran (Islamic Republic of)	62.7	38.8	26.5	-38.1	China	-38.6
Maldives	76.2	48.6	31.0	-36.2	Pakistan	-38.4
Nepal	138.5	98.4	65.4	-29.0	Guam	-37.0
Pakistan	159.8	127.8	98.5	-20.0	Lao People's Democratic Republic	-36.7
Sri Lanka	31.8	23.4	17.8	-26.2	Timor-Leste	-36.1
Turkey	73.8	49.5	34.1	-33.0	Azerbaijan	-34.7
North and Central Asia					Japan	-34.5
Armenia	25.0	19.8	16.7	-20.7	French Polynesia	-33.7
Azerbaijan	49.9	40.0	32.6	-19.9	Armenia	-33.3
Georgia	23.6	21.8	19.2	-7.6	Turkmenistan	-32.5
Kazakhstan	62.6	58.1	42.4	-7.2	Kazakhstan	-32.4
Kyrgyzstan	50.8	46.0	38.2	-9.4	Myanmar	-32.0
Russian Federation	27.9	20.8	19.7	-25.4	Uzbekistan	-31.7
Tajikistan	80.3	72.6	59.6	-9.6	Brunei Darussalam	-29.8
Turkmenistan	77.4	67.7	52.3	-12.5	Russian Federation	-29.5
Uzbekistan	62.6	51.8	42.7	-17.3	Macao, China	-27.0
Pacific					New Zealand	-26.8
Australia	8.0	6.7	6.2	-16.3	Tajikistan	-25.7
Fiji	43.6	22.0	18.0	-49.4	Kyrgyzstan	-24.7
French Polynesia	14.6	11.4	9.7	-21.7	Australia	-23.2
Guam	14.4	11.3	9.0	-21.1	Hong Kong, China	-20.2
Micronesia, Federated States of	53.8	41.9	30.3	-22.2	Georgia	-18.7
New Caledonia	17.1	9.5	8.1	-44.1	Afghanistan	-17.4
New Zealand	9.3	7.3	6.8	-21.4	Democratic People's Republic of Korea	30.7
Papua New Guinea	107.2	84.5	64.4	-21.2		
Samoa	45.3	31.5	23.6	-30.4		
Solomon Islands	44.4	30.4	22.6	-31.6		
Tonga	53.9	41.9	30.3	-22.2		
Vanuatu	47.9	34.9	27.0	-27.0		

Source: United Nations (2003). *World Population Prospects: The 2002 Revision, Vol. 1, Comprehensive Tables* (United Nations publication, Sales No. E. 03.XIII.6).

Iran, Maldives, Nepal, New Caledonia, the Philippines, Thailand, Turkey and Viet Nam. It may be assumed that these countries would be able to meet the goal of reducing the child mortality rate by two thirds. This does not mean however that the countries that have recorded lower declines are faring poorly. Understandably, countries with already relatively low levels of under-five mortality would face greater difficulty in meeting the child mortality goal. In the period 2000-2005, populations recording low levels of child mortality (less

than 25 per 1,000) include Armenia; Australia; Brunei Darussalam; Fiji; French Polynesia; Georgia; Guam; Hong Kong, China; Japan; Macao, China; Malaysia; New Caledonia; New Zealand; the Republic of Korea; the Russian Federation; Singapore; Sri Lanka; and Thailand. By contrast, while all ESCAP countries and areas have attained declines in child mortality, in the Democratic People's Republic of Korea, the child mortality rate is projected to increase by 30.7 per cent during this period.

C. Life expectancy: major trends

In comparison to infant and child mortality, reductions in adult mortality are generally more difficult to achieve for various reasons (Desbarats, 2003, p. 3). Yet, structural changes and advancements in socio-economic conditions in many countries across the world have resulted in a downward shift in adult mortality rates (Gragnolati, Elo and Goldman, 1999, p. 81; Morris, 2001, p. 874). In tandem with this shift is an extension of life expectancy in the ESCAP region and the rest of the world. A survey of the different regions across the world according to the United Nations estimates show that North America and Europe have the highest life expectancy at birth at 77.4 and 72.1 years respectively during the period 2000-2005, a record which they have held since the period 1950-1955. While Oceania and eastern Asia have the highest life

expectancy in the ESCAP region in the period 2000-2005, they are lagging behind North America and Europe by up to about 5.3 years (table 6). However, comparisons of rates between the periods 1970-1975 and 2000-2005 demonstrate that eastern Asia, South-eastern Asia and Oceania's life expectancy have demonstrated faster improvements. While eastern Asia and Oceania's life expectancy at birth rose moderately by about 7.9-8.3 years, figures in South-eastern Asia have gone up by nearly 14.7 years. Overall, the subregions of ESCAP, excluding south-central Asia in the period 2000-2005, recorded a higher life expectancy at birth than the global average. Interestingly, even the women of south-central Asia were not able to reach the global average life expectancy for both sexes combined, while women in eastern Asia have recorded life expectancies at birth more than 9.3 years higher than the global average for both sexes combined.

Table 6. Life expectancy at birth, by major regions of the world (years)

Region/subregion	1950-1955			1970-1975			2000-2005		
	Both sexes	Males	Females	Both sexes	Males	Females	Both sexes	Males	Females
World	61.3	59.4	63.2	58.0	56.5	59.5	65.4	63.3	67.6
Africa	49.8	48.3	51.3	46.2	44.8	47.7	48.9	47.9	50.0
Europe	71.9	67.9	75.7	71.0	67.4	74.4	74.2	70.1	78.2
Asia	60.3	59.4	61.4	56.3	55.9	56.8	67.2	65.5	69.0
Eastern Asia	67.7	66.2	69.2	64.2	63.1	65.2	72.1	69.7	74.7
South-central Asia	54.6	54.5	54.7	50.2	50.8	49.6	63.2	62.5	63.9
South-eastern Asia	58.1	56.2	60.1	52.0	50.3	53.8	66.7	64.4	69.1
Western Asia	62.9	60.9	64.9	57.7	55.8	59.6	69.1	67.1	71.3
Northern America	74.1	70.8	77.5	71.6	67.9	75.6	77.4	74.5	80.1
Latin America and the Caribbean	64.9	61.9	68.0	60.9	58.6	63.3	70.4	67.1	73.9
Oceania	69.3	66.5	72.1	65.8	63.1	68.7	74.1	71.8	76.6

Source: United Nations (2003). *World Population Prospects: The 2002 Revision, Vol. 1, Comprehensive Tables* (United Nations publication, Sales No. E. 03.XIII.6).

Note: The following are included in the "eastern Asia" subregion: China; Hong Kong, China; Democratic People's Republic of Korea; Japan; Macau; Mongolia; Republic of Korea. The "south-central Asia" subregion: Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Kazakhstan, Kyrgyzstan, Maldives, Nepal, Pakistan, Sri Lanka, Tajikistan, Turkmenistan; Uzbekistan. The "south-eastern Asia" subregion: Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste; Vietnam. The "western Asia" subregion: Armenia, Azerbaijan, Bahrain, Cyprus, Gaza Strip, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Turkey, United Arab Emirates, Yemen.

Within the ESCAP region, many countries have experienced significant increases in life expectancy in the last five decades. In the period 1950-1955, the longest life expectancy was recorded by Australia and New Zealand at 69.6 years (table 7). Countries in North and Central Asia such as Armenia and the Russian Federation also demon-

strated relatively high life expectancies at 64.8 and 64.5 years respectively. Although North America and Europe as regions have the highest life expectancies in the world, for the past 25 years Japan is the country that has set the record for highest life expectancy at birth, that is, 81.6 years for the period 2000-2005 not only in the ESCAP region

Table 7. Trends in life expectancy at birth in the ESCAP region (years), 1950-1955 to 2000-2005

Country, territory or area	Both sexes			Males			Females		
	1950-1955	1970-1975	2000-2005	1950-1955	1970-1975	2000-2005	1950-1955	1970-1975	2000-2005
East and North-East Asia									
China	40.8	63.2	71.0	39.3	62.5	68.9	42.3	63.9	73.3
Democratic People's Republic of Korea	49.0	63.0	63.1	48.0	61.2	60.5	50.0	65.0	66.0
Hong Kong, China	61.0	72.0	79.9	57.2	68.5	77.3	64.9	75.6	82.8
Japan	63.9	73.3	81.6	61.6	70.6	77.9	65.5	75.9	85.1
Macao, China	54.0	66.4	78.9	51.5	64.0	76.5	56.5	69.0	81.2
Mongolia	42.2	53.8	63.9	41.0	52.5	61.9	43.5	55.0	65.9
Republic of Korea	47.5	62.6	75.5	46.0	59.3	71.8	49.0	66.1	79.3
South-East Asia									
Brunei Darussalam	60.4	68.3	76.3	59.6	66.9	74.2	61.1	69.9	78.9
Cambodia	39.4	40.3	57.4	38.1	39.0	55.2	40.8	41.7	59.5
Indonesia	37.5	49.2	66.8	36.9	48.0	64.8	38.1	50.5	68.8
Lao People's Democratic Republic	37.8	40.4	54.5	36.5	39.1	53.3	39.2	41.8	55.8
Malaysia	48.5	63.0	73.1	47.0	61.4	70.8	50.0	64.7	75.7
Myanmar	36.8	49.3	57.3	35.6	47.4	54.6	38.2	51.3	60.2
Philippines	47.8	58.1	70.0	46.0	56.4	68.0	49.6	59.9	72.0
Singapore	60.4	69.5	78.1	58.8	67.4	75.9	62.1	71.8	80.3
Thailand	52.0	61.0	69.3	49.8	58.7	65.3	54.3	63.6	73.5
Timor-Leste	30.0	40.0	49.5	29.6	39.2	48.7	30.4	40.7	50.4
Viet Nam	40.4	50.3	69.2	39.1	47.7	66.9	41.8	53.1	71.6
South and South-West Asia									
Afghanistan	31.9	38.8	43.1	32.0	38.8	43.0	31.7	38.8	43.3
Bangladesh	37.5	45.2	61.4	38.3	45.6	61.0	36.7	45.0	61.8
Bhutan	35.2	43.2	63.2	34.5	42.5	62.0	36.0	44.0	64.5
India	38.7	50.3	63.9	39.4	51.2	63.2	38.0	49.3	64.6
Iran (Islamic Republic of)	44.9	55.3	70.3	44.9	55.4	68.9	44.9	55.2	71.9
Maldives	38.9	51.4	67.4	40.1	52.7	67.8	37.6	50.1	67.0
Nepal	36.3	43.3	59.9	36.8	44.0	60.1	35.8	42.5	59.6
Pakistan	41.0	49.0	61.0	42.3	49.5	61.2	39.8	48.6	60.9
Sri Lanka	55.5	65.1	72.6	56.2	64.0	69.9	54.7	66.8	75.9
Turkey	43.6	57.9	70.5	42.0	55.9	68.0	45.2	60.0	73.2
North and Central Asia									
Armenia	64.8	72.5	72.4	61.8	69.3	69.0	67.9	75.3	75.6
Azerbaijan	61.3	69.0	72.2	57.4	64.9	68.7	65.0	72.5	75.5
Georgia	61.5	69.2	73.6	57.5	65.0	69.5	65.4	72.9	77.6
Kazakhstan	56.5	64.4	66.3	51.7	59.2	60.9	61.9	69.4	71.9
Kyrgyzstan	55.4	63.1	68.6	51.3	58.8	64.8	59.8	67.3	72.3
Russian Federation	64.5	69.7	66.8	60.5	63.8	60.8	67.3	74.3	73.1
Tajikistan	55.7	63.4	68.8	53.3	60.8	66.2	58.4	65.9	71.4
Turkmenistan	53.0	60.7	67.1	49.7	57.2	63.9	56.6	64.1	70.4
Uzbekistan	56.4	64.2	69.7	53.2	60.7	66.8	59.9	67.4	72.5
Pacific									
Australia	69.6	71.7	79.2	66.9	68.4	76.4	72.4	75.2	82.0
Fiji	52.5	60.6	69.8	50.8	58.8	68.1	55.0	63.0	71.5
French Polynesia	48.9	60.9	73.1	48.0	59.3	70.7	50.0	63.0	75.8
Guam	57.0	66.6	74.5	55.4	64.6	72.4	59.7	69.2	77.0
Micronesia, Federated States of	54.6	62.6	68.6	54.1	62.2	68.0	55.2	63.3	69.1
New Caledonia	51.4	61.2	74.9	50.0	58.5	72.5	53.0	64.5	77.7
New Zealand	69.6	71.7	78.3	67.5	68.7	75.8	71.8	74.8	80.7
Papua New Guinea	34.7	44.7	57.6	33.8	43.8	56.8	35.7	45.7	58.7
Samoa	45.9	56.1	70.0	43.0	53.0	66.9	49.6	59.6	73.4
Solomon Islands	45.4	55.6	69.2	44.9	54.9	67.9	46.4	56.4	70.7
Tonga	54.6	62.6	68.6	54.1	62.2	68.0	55.2	63.3	69.1
Vanuatu	42.0	54.0	68.8	40.6	52.4	67.5	43.5	55.7	70.5

Source: United Nations (2003). *World Population Prospects: The 2002 Revision, Vol. I, Comprehensive Tables* (United Nations publication, Sales No. E.03.XIII.6).

but also in the world. Other economies in the ESCAP region such as Australia; Hong Kong, China; New Zealand; and Singapore are following closely behind with life expectancies ranging from 78 to 80 years. However, the magnitude of the increase varies across these economies. While Hong Kong, China; Japan; and Singapore have attained dramatic increases in life expectancy, nearly 10 years every two decades or so, Australia and New Zealand showed only modest increases, especially from the period 1950-1955 to the period 1970-1975 (table 7). The reason for Australia and New Zealand's modest increase in life expectancy may be explained by the fact that these countries were able to attain higher life expectancies at an earlier period; hence, should any increase be achieved, it would only be moderate. Moreover, Hong Kong, China; Japan; and Singapore are classic examples of populations that have achieved "accelerated" mortality decline (Santow, 1999, p. 45). In other words, while mortality decline may have been delayed in contrast to countries in the West, once the process took effect, it progressed far more rapidly.

Clearly, the life expectancy of women is higher than that of men (table 7). Life expectancy at birth in the period 2000-2005 for a Japanese female stands at 85.1 years while her male counterpart can expect to live to 77.9 years. It is interesting to note that the more developed a country, the larger is the gap between male and female life expectancy. Yet, it seems that the economic status of a country is especially important in determining the life expectancy of men, since life expectancy would be relatively high among women given the biological advantages they enjoy regardless of the level of development of a country. This point is underscored by the examples of Singapore and Sri Lanka. While Singaporean men can expect to live to 75.9 years in the period 2000-2005, Sri Lankan women would have already reached this life expectancy by this time (table 7). Hence, where improved socio-economic conditions play a role in determining life expectancy, they would seem to benefit men more than women.

Another gender difference emerges among countries with more advanced socio-economic conditions. Among these countries, differences in life expectancy between males and females range from five to seven years on average. However, exceptions are showing up in some South and South-

West Asian countries such as Sri Lanka and Turkey where gaps are seen to be widening (table 7). Here, significant mortality differences between the sexes have emerged without concomitant socio-economic development. An explanation for this trend has been attributed to strong government programmes on public health and hygiene, complemented by medical knowledge and technology from the West (Ogawa, 2003, p. 99; Gragnolati, Elo and Goldman, 1999, p. 81; Morris, 2001, p. 874). However, there are departures from this general rule. A notable example is Myanmar where the difference in life expectancy between males and females, i.e., 5.6 years, is akin to many of the more developed countries (table 7). Another example is Samoa where the gap between men and women is 6.5 years. Here, the significant differentials in life expectancy may be attributed to the poorer health status of men as a result of harmful lifestyles. Gender gaps in life expectancy at birth are also pronounced in North and Central Asia with the greatest difference recorded in the Russian Federation at 12.3 years followed by Kazakhstan at 11.0 years (table 7). Curiously enough, the trend of a wide gender gap in life expectancy has been recorded in this subregion since the period 1950-1955.

This having been said, it may be rightly assumed that the gender gap is narrower among countries at the lower stages of development. Such countries include Afghanistan and Timor-Leste where differences of less than two years have been recorded. Other countries with smaller differences in life expectancy between the sexes are found mainly in South Asia, such as Bangladesh, India, Maldives, Nepal and Pakistan. Contrary to Lopez's (2003) claim, in the South Asian case, female mortality is still strikingly higher than male mortality (Desbarats, 2003). Here gender differentials may be attributed to the preferential treatment towards the boy child that has resulted in the neglect of the girl child, as mentioned previously. This cultural practice has substantially increased deaths among girls, thereby reducing the overall life expectancy of females (cf. Visaria, 2004; Wadley, 1993; Khanna, 1997).

A gender dimension is also evident in healthy life expectancy at birth, otherwise defined as the approximate number of years that a newborn can expect to live based on current estimates of ill-health and mortality. In healthy life expectancy at

birth, health status is seen to have a significant impact on mortality, with healthier people leading longer lives and enjoying greater survival rates. As in life expectancy at birth, the healthy life expectancy at birth is uneven across the ESCAP region, with the more developed economies having longer healthy life expectancies in contrast to the less developed economies. Estimates from the *World Health Report 2002*¹ reveal that healthy life expectancy is highest in Japan, followed by Australia, New Zealand, Singapore and the Republic of Korea. In terms of gender differentials between life expectancy at birth and healthy life expectancy at birth, gender gaps tend to decrease from the former indicator to the latter. The narrowing of the gap between the sexes suggests that men who have been able to reach older age are more likely to have had more years of healthy living than women. In Japan, for example, males can expect to live 72.3 years of life in a healthy state while healthy life expectancy for women is 77.7 years. Given that life expectancy at birth is 77.9 years for males and 85.1 years for females, Japanese men suffer illnesses of 5.6 year on average, while Japanese women suffer illnesses for an average of 7.4 years. Thus, although women live longer lives, they are more likely to spend more years than men in an unhealthy state.

However, exceptions do exist as demonstrated in Bangladesh, the Lao People's Democratic Republic, Maldives, Nepal, Pakistan and Tonga. While in all these countries healthy life expectancy at birth tends to be higher for men than for women, this pattern is slightly different in Maldives, Nepal and Pakistan where males also have a longer life expectancy at birth. Nonetheless, it is curious that the trend of healthier life expectancy at birth favouring men more than women is prevalent mainly in South Asian countries. This may be explained by the fact that women in this subregion face greater disadvantages from the time of infancy to the period during reproductive age, thus having an impact on the quality of their health later in life.

Yet, there are countries in which women lead more years of healthy life than men for the longest periods. These countries are mainly concentrated in North and Central Asia. For example, women in Georgia, Kazakhstan, Kyrgyzstan, the Russian Federation and Turkmenistan live from 4.4 to 11.5 more years of healthy life compared with men mainly because of the unhealthy lifestyles led by men.

Conversely, there are countries and territories with the lowest gender differentials, with men and women having about an equal number of years of healthy living, namely, Afghanistan, Bhutan, Brunei Darussalam, India and New Caledonia.

D. Adult mortality

Based on United Nations estimates for the period 2000-2005, adult mortality across the ESCAP region is uneven, with the highest levels found in South-East Asia and North and Central Asia, and the lowest levels found in East Asia. In South-East Asia, adult mortality rates are highest in Cambodia, the Lao People's Democratic Republic, Myanmar and Timor-Leste, while in North and Central Asia, the rates are high in Kazakhstan and the Russian Federation. Outside these subregions, adult mortality is also high in Afghanistan and Papua New Guinea.

Across the ESCAP region, a significant difference is seen in adult mortality for males and females. In many countries, adult mortality rates are about twice as high or more among males than among females. Countries that demonstrate this trend are found mainly in North and Central Asia, with the Russian Federation showing the greatest difference. Outside this subregion, the disparity in male and female mortality levels is most pronounced in the Republic of Korea.

While women are advantaged with a higher life expectancy, the rate of mortality decline in the age group 15 to 60 during the past 10 years has also been faster for women than for men. However, exceptions to this general trend were recorded in Armenia, Australia, Azerbaijan, Brunei Darussalam, Fiji, Georgia, Kyrgyzstan, Maldives, New Caledonia, New Zealand, the Republic of Korea, Singapore, Tajikistan and Uzbekistan (table 8). Particularly in Azerbaijan, the percentage decline for men was 17.9 as compared with 11.0 for women.

¹ The estimates are based on the Multi-Country Survey Study, conducted in collaboration with World Health Organization Member States in the period 2000-2001. Later, these estimates were adjusted with the addition of new epidemiological information, new data from health surveys and new information on mortality rates, including findings from residents in health institutions and information on dependent comorbidity (WHO, 2003, pp. 137-139).

Table 8. Trends in adult mortality (45^q15) in the ESCAP region

Country, territory or area	Adult mortality (per 1,000)				Percentage change	
	1990-1995		2000-2005		Males	Females
	Males	Females	Males	Females		
East and North-East Asia						
China	178.2	112.3	150.2	90.1	-15.7	-19.7
Democratic People's Republic of Korea	218.9	142.1	283.9	194.3	+29.7	+36.8
Hong Kong, China	12.8	54.9	96.3	45.0	-14.7	-18.0
Japan	107.4	55.6	93.6	41.9	-12.8	-24.6
Macao, China	90.2	58.6	77.6	49.7	-14.0	-15.2
Mongolia	288.6	210.7	256.2	181.3	-11.2	-14.0
Republic of Korea	219.8	88.6	161.9	67.0	-26.3	-24.3
South-East Asia						
Brunei Darussalam	138.3	70.4	112.3	59.9	-18.8	-15.0
Cambodia	342.8	283.1	417.4	304.2	+21.8	+7.4
Indonesia	262.2	209.7	213.3	159.7	-18.7	-23.8
Lao People's Democratic Republic	368.3	318.7	331.1	283.8	-10.1	-11.0
Malaysia	194.5	121.1	168.2	93.2	-13.5	-23.1
Myanmar	330.9	260.5	366.5	268.7	+10.8	+3.1
Philippines	222.5	166.0	181.0	130.1	-18.7	-21.6
Singapore	133.3	83.7	106.1	69.9	-20.4	-16.5
Thailand	203.0	131.8	208.4	122.2	+0.6	-7.3
Timor-Leste	452.5	403.7	396.6	350.0	-12.4	-13.3
Viet Nam	234.4	175.8	195.3	137.0	-16.7	-22.1
South and South-West Asia						
Afghanistan	402.8	362.7	390.9	349.8	-2.9	-3.6
Bangladesh	323.9	302.9	266.8	248.4	-17.6	-18.0
Bhutan	298.5	253.2	243.4	201.7	-18.5	-20.4
India	246.8	199.4	217.2	163.3	-12.0	-18.1
Iran (Islamic Republic of)	208.8	162.8	167.5	123.5	-19.8	-24.1
Maldives	228.1	235.8	177.3	183.8	-22.3	-22.1
Nepal	329.9	318.8	272.8	261.2	-17.3	-18.1
Pakistan	245.2	221.7	208.3	185.1	-15.1	-16.5
Sri Lanka	180.4	112.9	156.6	88.3	-13.2	-21.8
Turkey	184.5	126.5	161.6	99.6	-12.4	-21.2
North and Central Asia						
Armenia	197.5	85.4	165.5	73.7	-16.2	-13.7
Azerbaijan	241.2	111.4	198.1	99.1	-17.9	-11.0
Georgia	220.6	86.5	204.1	80.3	-7.5	-7.1
Kazakhstan	338.7	159.5	352.5	154.4	+4.1	-3.2
Kyrgyzstan	282.5	136.3	259.1	131.3	-8.3	-3.6
Russian Federation	394.6	138.0	413.6	145.7	+4.8	+5.6
Tajikistan	219.0	142.0	206.5	136.6	-5.7	-3.8
Turkmenistan	266.9	154.1	240.5	138.5	-9.9	-10.1
Uzbekistan	245.0	144.5	212.9	127.2	-13.1	-11.9
Pacific						
Australia	118.8	65.4	100.2	55.9	-15.7	-14.5
Fiji	266.8	188.8	203.3	149.5	-23.8	-20.8
French Polynesia	207.9	136.3	164.1	102.2	-21.0	-25.1
Guam	179.0	98.3	145.2	79.2	-18.9	-19.5
New Caledonia	215.9	115.9	159.3	87.3	-26.2	-24.7
New Zealand	133.3	82.7	109.7	68.5	-17.7	-17.1
Papua New Guinea	438.7	386.9	375.4	326.9	-14.4	-15.5
Samoa	274.2	172.0	214.3	125.7	-21.9	-26.9
Solomon Islands	225.4	192.3	177.8	139.0	-21.1	-27.7
Vanuatu	260.6	209.7	205.8	161.7	-21.0	-22.9

Source: United Nations (2003). *World Population Prospects: The 2002 Revision, Vol. 1, Comprehensive Tables* (United Nations publication, Sales No. E.03.XIII.6).

It is also interesting that, while there are overall declines in adult mortality rates in the age group 15 to 60 years in the ESCAP region, increases in adult mortality have also been demonstrated. During the period 1990-1995 to 2000-2005, Cambodia, the Democratic People's Republic of Korea, Kazakhstan, Myanmar and the Russian Federation have witnessed some increases in adult mortality rates, with increases being more pronounced for men than women in Cambodia and Myanmar. The Democratic People's Republic of Korea witnessed a marked increase in adult mortality, by 29.7 per cent for men and 36.8 per cent for women, during this period.² Increasing adult mortality was relatively modest in the Russian Federation, with the increase for men being recorded at 4.8 per cent and for women 5.6 per cent.

Although women enjoy longer life expectancies than men, they face different health risks, especially as a result of medical complications arising from pregnancy and childbirth. Most of these complications, however, could be prevented if obstetric services were easily available. It is for this reason that maternal deaths have been two or three times higher in rural and mountainous areas than elsewhere in a country (United Nations, 2003b, p. 27).

In the world, the estimated number of maternal deaths was 529,000 in 2000. Of these, 251,000 and 253,000 occurred in Africa and Asia respectively.³ Countries in Asia recording high numbers of maternal deaths include India (136,000), Pakistan (26,000), Afghanistan (20,000), Bangladesh (16,000), China (11,000) and Indonesia (10,000). In terms of the maternal mortality ratio (MMR), the global estimate was found to be 400 per 100,000 live births. However, MMRs showed marked variations across regions, with the highest figures estimated in Africa at 830 per 100,000 live births, followed by Asia at 330 per 100,000 live births and Oceania at 240 per 100,000 live births. While Latin America and the Caribbean recorded an MMR of

190 per 100,000 live births, more developed countries in that region saw very low rates of 20 per 100,000 live births.

During the period 1985-2002, MMRs, based on available data from reviews by the United Nations Children's Fund (UNICEF), World Health Organization (WHO) and United Nations Population Fund (UNFPA), adjusted to account for the problem of underreporting and misclassification (United Nations Development Programme, 2004), show stark variation across the ESCAP region. There were 16 countries with a low MMR (below 50 per 100,000 live births), with Brunei Darussalam, Singapore, Japan and Turkmenistan demonstrating ratios below 10 maternal deaths per 100,000 live births (table 9). While nine countries in the region have recorded a moderately high MMR (50-199 per 100,000 live births), six countries have high MMRs (200-399 per 100,000 live births), and another six countries, namely, Solomon Islands, Nepal, India, Pakistan, the Lao People's Democratic Republic and Cambodia, have very high MMRs (above 400 per 100,000 live births).

II. UNDERLYING CAUSES OF MORTALITY

From the preceding discussion, it is clear that some countries have achieved greater levels of mortality decline than others. By and large, mortality trends are affected by socio-economic factors, suggesting that greater declines are found in countries moving towards or at a more advanced stage of development (Bannister and Hill, 2004). Although many countries in the Asian and Pacific region have achieved gains in life expectancy, paradoxically high mortality rates still persist in many countries. While the stage of development in which a country finds itself has a significant bearing on mortality levels, other factors play substantive roles in determining mortality trends.

A. Causes of death specific to high mortality populations

One of the leading causes of persistently high mortality rates is poverty. It is a well-known fact that people in lower socio-economic groups have a higher risk of dying at a younger age than those who hold high socio-economic positions (Valkonen, 1999, p. 291). Considering that popula-

² Mortality rates tend to be uniformly high across the different age groups (that is, for infants, children under-five years of age and adults) owing to the shortage of food in the country.

³ For details, see *Executive Summary of Maternal Mortality in 2000: Estimates Developed by WHO, UNICEF and UNFPA* at http://www.who.int/reproductive-health/publications/maternal_mortality_2000/executive_summary.html, accessed on 24 August 2004.

Table 9. Adjusted maternal mortality rates, 1985-2002 (per 100,000 live births)

	1985-2002
Very high (>400)	
Solomon Islands	550
Nepal	540
India	540
Pakistan	530
Lao People's Democratic Republic	530
Cambodia	440
High (200-399)	
Indonesia	380
Bangladesh	380
Papua New Guinea	370
Maldives	350
Bhutan	260
Myanmar	230
Moderately high (50-199)	
Philippines	170
Mongolia	160
Turkey	130
Viet Nam	95
Sri Lanka	92
Vanuatu	68
Georgia	67
China	53
Kazakhstan	50
Low (<50)	
Tajikistan	45
Kyrgyzstan	44
Fiji	38
Russian Federation	37
Iran (Islamic Republic of)	37
Thailand	36
Uzbekistan	34
Malaysia	30
Azerbaijan	25
Armenia	22
Republic of Korea	20
New Zealand	15
Turkmenistan	9
Japan	8
Singapore	6
Brunei Darussalam	0

Source: United Nations Development Programme (2004). *Human Development Report 2004* (New York: UNDP) (based on available data).

tions earning less than US\$ 1 per day are more likely to face higher mortality risks, it should come as no surprise that many countries in the ESCAP region may find themselves in this dilemma (see also Khabir, 2003, p. 2056). An analysis of ESCAP

countries with large proportions of their populations earning less than US\$ 1 a day demonstrates this point. For example, not only do Bangladesh, Cambodia, India, the Lao People's Democratic Republic and Nepal have large proportions of their populations earning less than US \$1 a day, but mortality rates are also highest in these countries compared with others in the region (see figures 1, 2 and 3). Owing to poverty, high mortality rates persist, especially in rural areas and among the poorest of the poor in cities and towns (Desbarats, 2003). In Viet Nam, for example, the poor suffer a higher disease burden and thus have a greater need for health-care services (Thang and Popkin, 2003). Yet, the poor are not able to seek medical care because of their inability to afford medical fees. This is evidenced by the fact that the use of medical facilities is less frequent (3.4 per cent of the population) in the rural and mountainous areas compared with 25.9 per cent of the population in the delta area (Do, 1999, as cited in Thang and Popkin, 2003, p. 257).

The relationship of people to the natural environment in which they live also has a significant bearing on determining health and, in turn, human survival. As such, the mortality rate is an indication of how the environment is managed. Environmental factors such as poor sanitation, poor hygiene and unsafe water are strongly correlated with higher mortality rates, especially among infants and children who tend to have lower resistance in combating infectious diseases. Living in poor conditions brought about by low socio-economic status also has a negative impact on mortality rates (Jatrana, 2003). Dirty water and poor sanitation are the main causes of more than half a million infant deaths a year as a result of diarrhoea (UNEP, 2001, p. 24). United Nations scientists surmise that arsenic in water sources in Bangladesh may be killing about 20,000 people each year (Pierce, 2001, as cited in UNEP, 2004). Lead from industrial effluents has also polluted Asia's waters. South-East Asian waters, in particular, have been found to contain 20 times more lead than surface waters in countries belonging to the Organisation for Economic Cooperation and Development (Asia Development Bank, 1997, as cited in Tay, Show and Lua, n.d., p. 4). In addition, some diseases are endemic to specific terrains. For example, the jungles along the border between Myanmar and Thailand are malaria-infested; hence, minority groups from the inland reaches of Myanmar seeking refugee on the Thai side of the border are vulner-

able to contracting the disease (Paquet and Hanquet, 1998). South-central Asia is also struggling to reduce malaria-related deaths. How the environment is managed is also a consequence of urban over-crowding, which has facilitated the spread of infectious diseases. For example, in crowded areas such as cities and towns, mosquito-born dengue fever is prevalent, especially in the hotter and rainier months.

Nutrition is considered to be a major determinant for reducing mortality across countries (Fogel, 1994; Fogel and Costa, 1997, as cited in Horiuchi, 1999, p. 57). It has been found that underweight is a greater health-risk factor than non-communicable diseases in developing countries with high mortality rates. Chronic malnutrition is responsible for high rates of death, especially among

children in South Asia (except for Sri Lanka), as well as Cambodia, Indonesia, the Lao People's Democratic Republic, Myanmar, Papua New Guinea and Viet Nam (Knowles, 2000, p. 3). While countries across the Asian and Pacific region have demonstrated declines in infant mortality rates, except for those plagued by war, the Democratic People's Republic of Korea's infant mortality rate surged from 9.2 per 1,000 live births in 1990 to 23 per 1,000 live births in 1999 (Khabir, 2001, p. 1684). Child mortality rates have also seen a similar trend, increasing from 30 per 1,000 in 1990 to 55 per 1,000 in 1999.

Political instability causes havoc in a country, and the scourge of war is an obvious reason for extreme levels of high mortality in some countries of the ESCAP region. Afghanistan and Timor-Leste

Figure 1. Correlation between countries with populations earning less than US\$ 1 a day and infant mortality rate

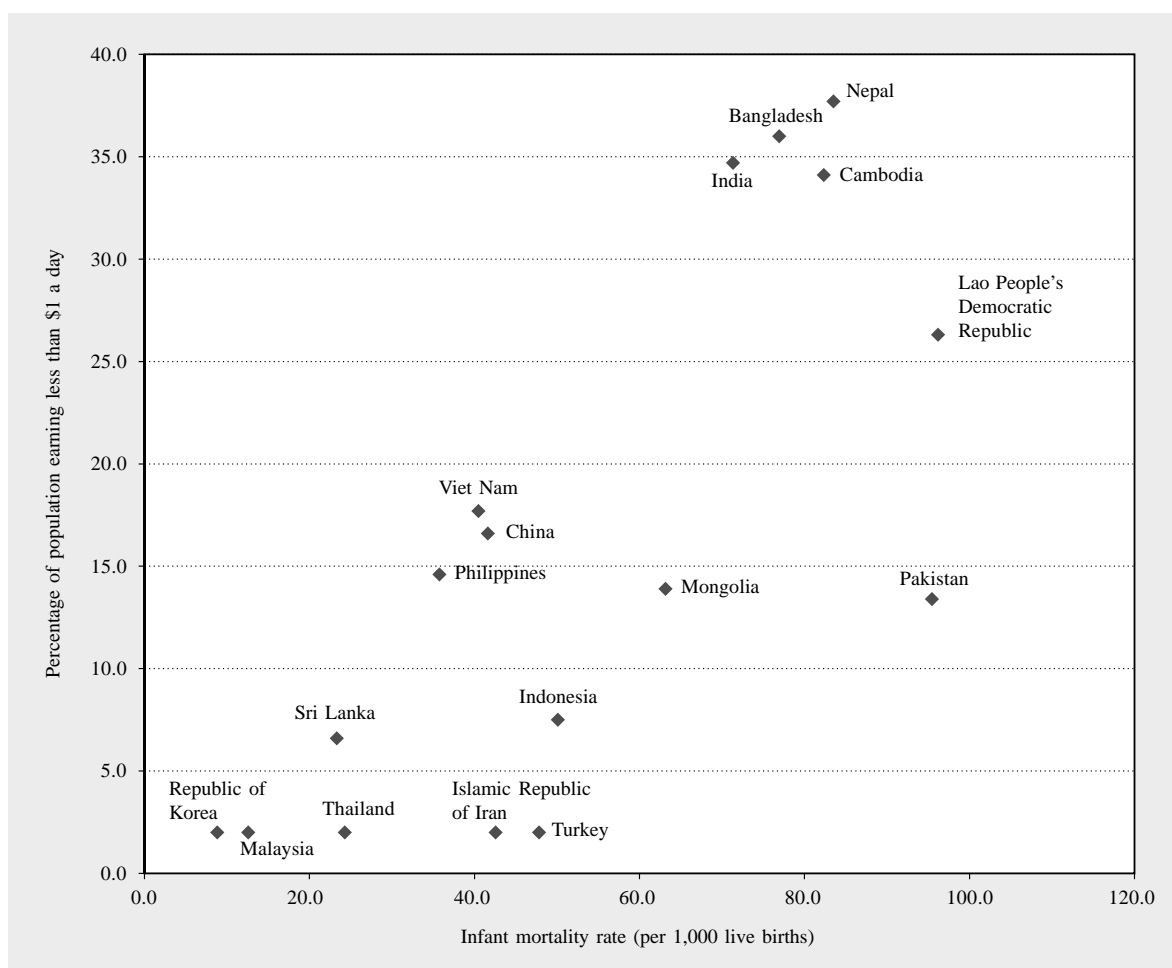


Figure 2. Correlation between countries with populations earning less than US\$ 1 a day and child mortality rate

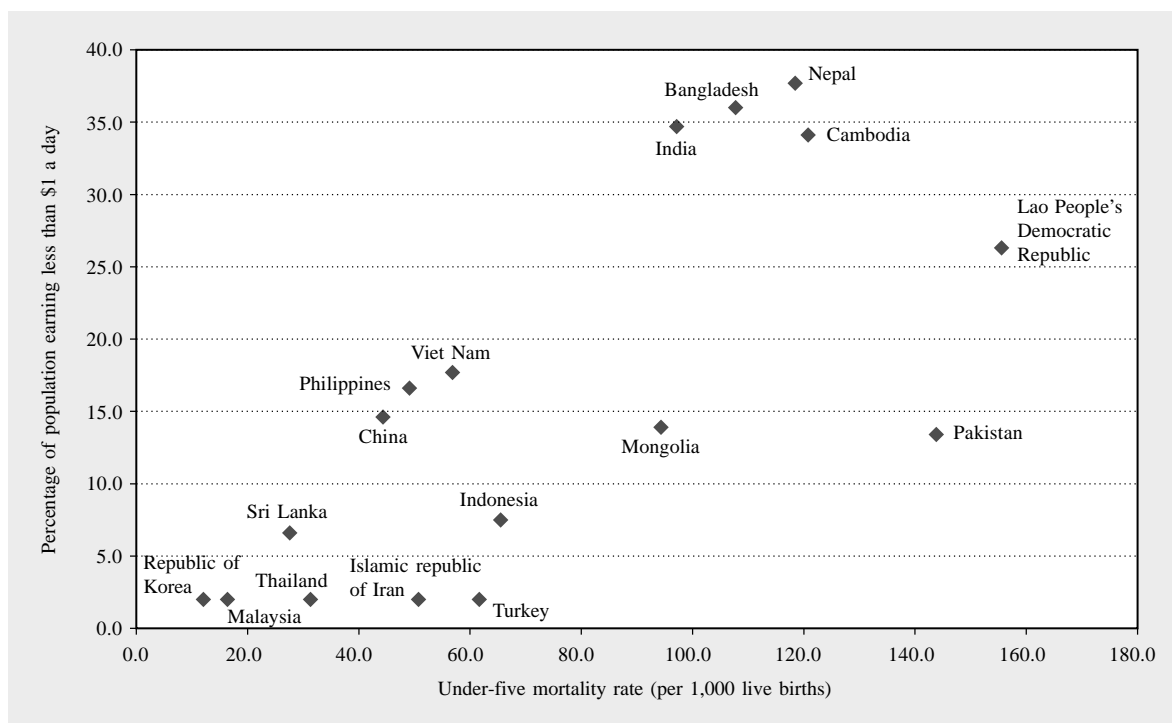
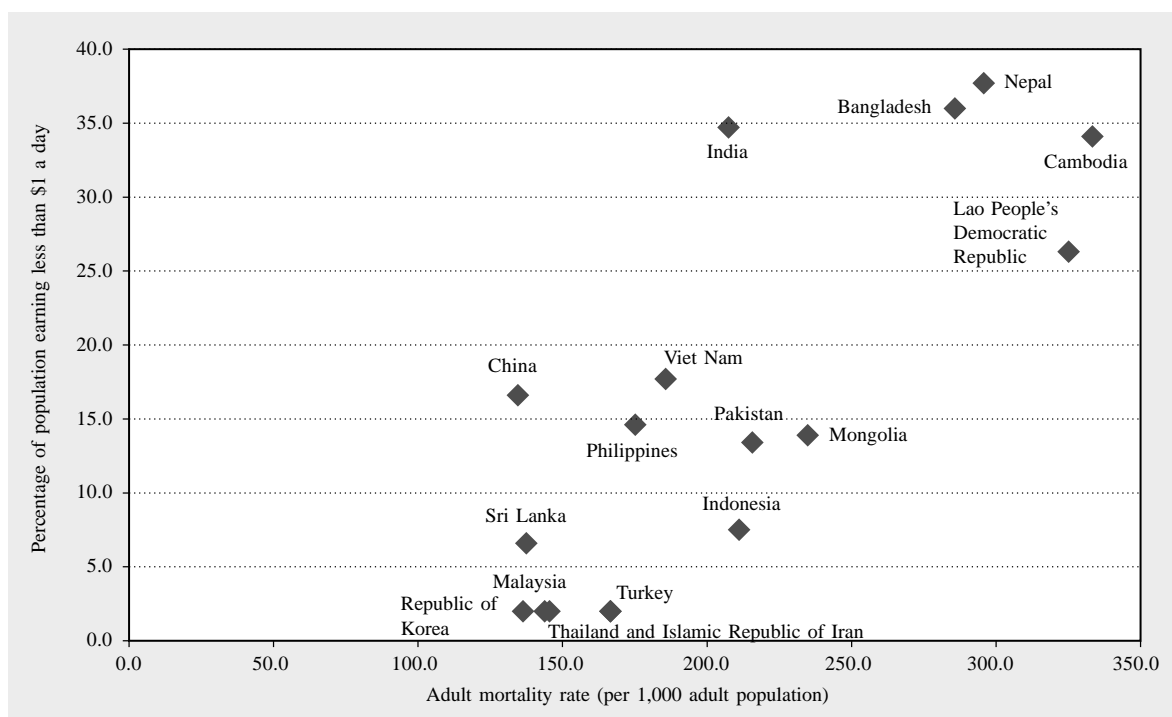


Figure 3. Correlation between countries with populations earning less than US\$ 1 a day and adult mortality rate



have had high levels of child and adult mortality respectively, although countries that have suffered wars in the past such as Cambodia and, to a lesser extent, Viet Nam also have relatively high mortality rates. Here, high mortality rates are caused mainly by the spread of disease, poor living conditions and lack of access to medical services. Although recovering war-torn countries have been striving towards rebuilding their infrastructure and, in this effort, establishing a health-care system to meet the needs of its citizenry, access to such facilities is still uneven.

Beyond poor socio-economic conditions, factors affecting women's health status in pregnancy include a mother's access to resources such as food which is critical to her health and nutritional status. Evidence shows that the lack of adequate health facilities, unhealthy sanitary conditions and the absence of skilled health personnel increase the chances of a woman dying in childbirth. National laws also have an effect on maternal mortality. In many Islamic countries, for example, abortion is illegal, which has paved the way for unsafe abortions, contributing to maternal deaths that often go unreported (Pathmanathan and others, 2003). Induced abortions as a result of sex-selection in parts of India, where males are preferred over females, also has the effect of jeopardizing a woman's health, thereby increasing the risk of maternal death (Khanna, 1997; see also Westley and Mishra, 2001). In addition, maternal mortality is high in the developing world because of high fertility. Frequent childbearing with inadequate spacing between births can also affect the health of a woman, eventually bringing about her early death. Previous arguments have been put forth that the younger the mother (below age 20) at childbirth, the higher is the probability of her dying prematurely (Westendorp and Kirkwood, 1998; and Doblhammer, 2000, as cited in Menken, Duffy and Kuhn, 2003). According to the National Research Council of the United States (1997, as cited in Menken, Duffy and Kuhn, 2003, p. 405), women from developing countries have a lifetime chance of 1/48 of dying from complications arising from pregnancy compared with women from developed countries who have a 1/1,800 chance of dying under such circumstances. Evidence from Bangladesh, a country that has high levels of maternal mortality, also shows that rural women's survival is not necessarily related solely to the cumulative effects of the number of children a woman has or the speed at which she is producing children, but rather to the mortality risk she faces

every time she gives birth (Menken, Duffy and Kuhn, 2003, p. 418). As such, the problem is compounded when mortality risks are felt several years after a birth, resulting in part from complications related to the pregnancy or the birth itself and in part to long-term illnesses that either develop during pregnancy and childbirth or are exacerbated by pregnancy and childbirth. It is for these reasons that frequent childbearing increases the vulnerability of a woman to maternal mortality.

B. Causes of deaths specific to high and intermediate mortality populations

Infectious diseases such as tuberculosis still plague many developing countries (Lopez, 2003, pp. 83-84). In 2002, tuberculosis caused 2 million deaths worldwide, with the largest number of cases (33 per cent or 625,000 deaths) occurring in South-East Asia alone.⁴ East Asia and South Asia are also not spared the effects of this disease, although incidence rates are lower. Tuberculosis remains a significant public health problem in China with 1.4 million new cases being recorded each year, which is second only to India. However, prevalence rates of tuberculosis infection have dropped by 30 per cent with the implementation of the "DOTS" (directly observed therapy short-course), a decade-long tuberculosis programme funded by the World Bank, applied to half the country's population. The success of DOTS has lent weight to the justification for its expansion to the rest of the country. Severe acute respiratory syndrome (SARS) is another infectious disease. The virus that causes SARS is easily spread among people; thus, their movement causes epidemics across various countries. In the ESCAP region, an outbreak of SARS in 2003 affected 13 countries, with China recording the highest number of cases (5,328) and deaths (343), followed by Hong Kong, China, with 1,755 cases and 291 deaths (WHO, 2003, as cited in Xiang and Wong 2003). Taiwan Province of China and Singapore also reported high numbers of cases and deaths. Given the nature of the corona virus that causes SARS, mortality rates were highest among older persons whose level of immunity was the lowest, thus demanding that specialist care be put in place to provide care for this group. However, the most disturbing fact was that health-care work-

⁴ See <<http://www.who.int/mediacentre/factsheets/fs104/en>>, for details.

ers constituted the most vulnerable group. In Hong Kong, China, 62 per cent of those who were either infected or died of the infection were health-care workers (Xiang and Wong, 2003).

Unsafe abortions also continue to pose a risk to women's lives and health in some developing countries in the region. Although Asia as a whole has the lowest rate of unsafe abortion across the developing world, more than half the world's unsafe abortions occur in Asia (10.5 million), with more than one third taking place in South-Central Asia.⁵ The problem in these developing areas is that safe abortions are not provided by the public health-care system and, if they are available, the services are poor, thus jeopardizing women's health and, in turn, their lives.

C. Causes of death specific to low mortality populations

As countries develop, the risk factors associated with mortality change. While in high-mortality countries, poverty, unsanitary conditions, poor nutrition and inadequate health facilities are the main causes of mortality, and rising affluence and changing lifestyles have changed the disease profile of developing countries with low mortality rates. Low-mortality developing countries in the Asian and Pacific region are following mortality patterns already evident in the more developed and "Westernized" countries, characterized by a rise in the numbers of people with non-communicable diseases such as heart disease, diabetes and cancer (Woodward and Reid, 2003, p. 71). While lower respiratory infections, perinatal conditions and diarrhoea, although more closely related to poverty, accounted for one quarter of the deaths in Asia in 2001, ischaemic heart disease and cardiovascular disease accounted for one fifth of all deaths (Desbarats, 2003, p. 4). Unlike in low-mortality developed countries, the provision of health-care services in the low-mortality developing countries has not been able to keep up with the fast-changing disease profiles that have emerged in these localities. For example, in China medical personnel and facilities are not always sophisticated enough to diagnose accurately and treat successfully non-communicable diseases, which have been found to be the main

cause of death since the 1970s (Bannister and Hill, 2004, p. 68). In other countries such as India, health-care programmes to prevent cardiovascular disease have been slow since health-care policy for many years has focused on communicable diseases and reproductive health issues (Nishtar, 2002, p. 1016).

Dietary changes that include large amounts of saturated fats, sugars and salt coupled with a lower intake of dietary fibre found in fruit and vegetables are thought to be responsible for the higher incidence of heart disease and cancer in countries with low mortality rates (Tunstall-Pedoe and others, 2003), although such foods may improve resistance against infectious diseases. In such countries, mortality levels are also determined by unhealthy lifestyles such as tobacco use and alcohol consumption, which have adverse effects on other medical complications such as high blood pressure (Ezzati and others, 2002, p. 1356). In fact, smoking alone has been said to cause about 1.6 million deaths each year in developing countries, with half the deaths occurring in China (Lopez, 1999, p. 400). The majority of these deaths, however, occur among men since 60 per cent of men in China are regular smokers (Lopez, 1999, p. 390). Men in China were also found to suffer from excess mortality mainly as a result of lung cancer, accident-related injuries, and cardiovascular and chronic respiratory diseases (Bannister and Hill, 2004, p. 66). In India, the rise in cigarette smoking has also been related to disease; 40 per cent of Indian men are regular smokers (Lopez, 1999, p. 390), while greater alcohol consumption and drug abuse are also factors having an impact on mortality in that country (Gwatkin, 1993; Murray and Lopez, 1996, as cited in Visaria, 2004).

Other lifestyle-related factors affecting health status and therefore mortality rates in low-mortality developing countries are lack of exercise and inactivity. A sedentary lifestyle, however, is more prevalent among urban dwellers in contrast to those living in rural communities. Growing numbers of rural Chinese reportedly experienced an increase in life expectancy, even though access to health-care facilities may not be readily available in rural areas (Zeng and others, 2001, p. 107).⁶ Unlike urban

⁵ For details, see <<http://www.acpd.ca/acpd.cfm/en/section/SRRResources/articleID/190>>.

⁶ However, the numbers selected are those who survived the dangers of being born, the risks of infancy and childhood, and the illnesses and accidents faced in middle age.

dwellers, a much larger number of rural Chinese survive into the oldest segment of old age. Increases in life expectancy among these older persons have been attributed to the active lifestyle they had led in their younger years. Since men tend to lead more active lives than women, it was found that many more of those in the oldest-old cohort have fewer difficulties with carrying out activities of daily living (ADL) (Zeng and others, 2001, p. 106), while a larger number of women of similar age suffer from mild or severe disability.

Although the relationship between industrial pollution and mortality is spurious, as attested by the case of Hong Kong, China, which is considered to be one of the most polluted areas in the world but an area having a relatively low mortality rate (Kesteloot, 1999, p. 357), it cannot be denied that pollution in cities worsens particularly the health status of older persons who are more vulnerable to respiratory infections. In some cities, air pollution is six times higher than the limit imposed by WHO guidelines (De Souza, Williams and Myerson, 2003, p. 31). The effects of air pollution on morbidity and mortality have been enormous in countries such as China. It has been reported that smoke and small particles from burning coal have resulted in more than 50,000 premature deaths and 400,000 new cases of chronic bronchitis each year in 11 of its major cities (World Bank, 1997, as cited in UNEP, 2001, p. 35). In the same way that air pollution affects older people, young children have been found to be susceptible to respiratory conditions in countries such as Bangladesh, India, Indonesia and Nepal.

D. HIV/AIDS: Emergent threats

The threat of HIV/AIDS is a cause for concern in view of the impact of this pandemic on mortality trends as they affect high, intermediate and low mortality situations in the ESCAP region. Although at the global level, HIV/AIDS is the fourth major cause of death, the data show that in Asia its impact has been somewhat less threatening to date. Nonetheless, there is deep concern that deaths attributed to AIDS have been on the rise and are substantial in view of the fact that Asia is home to two of the world's most populated countries – China and India (Desbarats, 2003, p. 7).

Specifically, China has been said to stand on “the precipice of a potential AIDS catastrophe” with United Nations estimates of 1.5 million

infected with HIV. India faces an even greater threat, having the largest number of people living with HIV/AIDS outside Africa, an estimated 4.6 million (UNAIDS, 2004, p. 26). In South-East Asia, serious epidemics have erupted in Cambodia, Myanmar and Viet Nam. Although Thailand has successfully battled against the spread of HIV, mainly through increased condom use, spouses and partners of clients of sex workers continue to be at risk of contracting HIV (see Westley, 1999). UNAIDS has warned that 2003 saw the highest rate of HIV infections worldwide, that is, 4.8 million, since the virus was first detected in the early 1980s (UNAIDS, 2004, p. 23). Unsafe sexual practices have been identified to be the main reason for the rise in HIV-related deaths among adults.

Papua New Guinea has the highest HIV-infection rate in Oceania. Although the HIV infection rate is lower in Vanuatu and Samoa, the chronically high rates of sexually transmitted diseases among pregnant women suggest that their vulnerability to HIV infection is potentially high. While in these and most other ESCAP countries, the spread of HIV/AIDS is due to heterosexual behaviour and the injection of illicit drugs, the mode of transmission in Australia tends to be men having sex with men. That country was successful in reducing HIV infection rates at the onset of its spread, but recently HIV/AIDS cases were found to have been gradually increasing over the last five years (UNAIDS, 2004: 30).

III. STRATEGIES TO REDUCE MORTALITY

Given the link between staying healthy and living a longer life, changes in mortality can be achieved only with improvements in health. Strategies to improve health and thereby reduce mortality rates are dependent upon the level of mortality of a country. They also can be multidimensional, following from the fact that it is a confluence of causes that determine mortality levels.

It is clear from the preceding discussion that causes of mortality overlap across countries with high, intermediate and low mortality levels. This means that each country, depending on its mortality levels, will need to prioritize its health policies and actions accordingly in order to address its specific causes of mortality. Strategies for reducing

mortality also fall along a continuum. For example, Governments of countries with high mortality rates will most likely have to concentrate their efforts on addressing structural inadequacies in the areas of health-care services, programmes to eradicate extreme poverty and programmes to eliminate unsanitary living conditions more than on relying on individual responsibility. In contrast, bearing in mind the causes that determine mortality in countries with low mortality rates, Governments of such countries should recognize that the disease burden begins to shift to the individual and, as such, any

government effort to reduce mortality levels needs to be focused on increasing individual awareness about achieving a healthful lifestyle. What this also means is that countries with intermediate levels of mortality require both structural interventions as well as methods for promoting individual responsibility in order to address mortality issues. The relationship between mortality levels and the kinds of strategy to be adopted to reduce death rates is captured in table 10; the section that follows the table contains recommendations for reducing mortality.

Table 10. Strategies for reducing mortality

<i>Mortality level</i>	<i>Priorities for reducing mortality</i>
High	<ul style="list-style-type: none"> (a) Improving the health care infrastructure (b) Interventions in health care to combat infectious diseases via good governance (c) Poverty reduction programmes (d) Education and nutrition programmes (e) Environmental improvement programmes (f) Services targeted at marginalized groups (g) Partnerships with NGOs
Intermediate	<ul style="list-style-type: none"> (a) Interventions in health care to combat infectious diseases via good governance (b) Services targeted at marginalized groups (c) Education and nutrition programmes (d) Individual responsibility
Low	<ul style="list-style-type: none"> (a) Individual responsibility (b) Interventions in health care to combat infectious diseases via good governance

A. High and intermediate mortality situations: priorities for reducing mortality

1. Improving structural factors

In developing countries with high child and adult mortality, structural factors in the form of the provision of medical care have proven to be the single most important factor for eliminating infectious diseases. Evidence affirms that public health measures and biomedical advances were significant in reducing male and female vulnerability to leading chronic and infectious diseases. As such, effective policies need to be in place to ensure improvements in the health-care infrastructure. Ideally, national public health-care plans should go beyond the provision of basic-service priorities, such as immunization, health promotion, tuberculosis control and nutrition, to include preventive and health promo-

tion programmes as well. Paradoxically, while many countries with high mortality rates may not have the economic resources to build an adequate health-care infrastructure, they are forced to recognize that it is an investment in health care that will eventually reduce mortality levels.

2. Good governance

Building a good health infrastructure also presupposes good governance. Good governance, in particular, is necessary for combating infectious diseases in countries with high, intermediate or even low mortality levels. Good governance ensures the coordinated effort of different levels of health authorities in a context where an epidemic needs to be fought. Moreover, it is vital to put in place mechanisms to enable immediate action such as when an epidemic arises.

3. Improving poverty-reduction programmes

Strategies to improve mortality rates should go hand in hand with efforts to eradicate poverty through economic growth. It cannot be denied that poverty reduction in developing countries eventually leads to improvements in health and a reduction in mortality rates, as people are more likely to seek out medical assistance when they are able to afford it. Studies have shown that when populations have difficulty accessing health care, whether because of poverty or otherwise, the health of those who are ill declines further, eventually affecting the individual's ability to work, thereby leading the person deeper into poverty, with even poorer access to health-care services than before. Hence, investments in health care should attempt to make such services easily available and affordable to the poor. Furthermore, it may also require putting in place a health insurance scheme so that the poor will have access to adequate medical care. It is for these reasons that Governments may need to prioritize policies to overcome specific barriers to health interventions.

4. Education and nutrition programmes

Investments in human resources through education and nutrition programmes are also critical in lowering mortality rates. Evidence points to the fact that educational programmes provided at the district level are critical in reducing mortality rates. Knowledge and greater interaction in the public sphere would ensure that not only women have better health, but also their children would have improved diets as these women are more likely to make informed choices. Moreover, knowledge enables women to make full use of the appropriate health-care services when needed. Increasing awareness, however, needs to be strengthened by literacy programmes.

5. Environmental programmes

Poverty reduction also presupposes a development strategy that involves changes made to the physical environment in developing countries, especially in areas where there is overcrowding. As such, there needs to be the provision of basic amenities such as clean water, management of wastes and modern sanitation to curb the spread of diseases, which would thus lower mortality rates. Although spraying insecticides may inhibit the spread of mosquito-borne diseases such as malaria, for ex-

ample, altering the physical environment in which people live by methods such as building ventilated houses and clearing open dug-wells would also be significant in lowering death rates. Particularly in urban areas, policies should be implemented to decrease the amounts of vehicular pollutants.

6. Targeted services for marginalized groups

Reducing mortality levels should involve targeting health-care interventions by way of improved medical facilities and insurance coverage for different segments of society such as the poor in many developing countries. In most developing countries, greater effort also needs to go into strengthening decentralized State-funded health facilities so that those who are disadvantaged as a result of living in rural areas would also have good access to health-care services, since evidence points to the fact that mortality rates generally tend to be higher in rural areas. In this case, decentralizing the health-care system and using health workers to disseminate health information at the grass-roots levels are needed. The needs of other marginalized groups should also be prioritized. For example, facilities for women should include prenatal care and family planning programmes, while child-care amenities should ensure the immunization of infants. Other services targeted at women that are required in order to decrease mortality include reducing fertility through reproductive health programmes including family planning; this measure has been found to have the added advantage of decreasing infant and child mortality.

7. Partnerships with NGOs

Partnerships between Governments and non-governmental organizations (NGOs) are also vital in reducing mortality levels. The role of NGOs in reducing mortality rates cannot be underestimated, especially in developing countries, since most work at the grass-roots level has the greatest impact on informing choices. In the same vein, the work of NGOs is invaluable in providing services and information that will curb the spread of other diseases.

B. Intermediate and low mortality situations: priorities for reducing mortality

As mentioned previously, the burden of reducing mortality becomes transferred to the individual in countries where the health-care infra-

structure has been in place for some time. Although the disease burden shifts increasingly to the individual in countries with low mortality, Governments should recognize that they still play a critical role through education and raising awareness in reducing mortality. While programmes and campaigns on healthy lifestyles and diets are necessary in such populations, measures should be put in place to enable people to make such lifestyle changes. For example, policy interventions through the application of taxes on cigarettes and alcohol would deter excessive smoking and drinking. Governments can also promote certain lifestyles by the kinds of

advertisements publicized in the media. Furthermore, Governments can also encourage employers to mandate an active lifestyle through exercise in their staff welfare programmes. Nonetheless, it must be noted that even in countries with low mortality rates, there still exist pockets of individuals who are more susceptible to higher mortality levels such as marginalized ethnic groups and the urban and rural poor. Thus, government policy interventions are still necessary to address the health and mortality problems specific to these groups in spite of the overall downward mortality trend of the rest of the populace.

References

- Action Canada for Population and Development (2004).
<<http://www.acpd.ca/acpd.cfm/en/section/SRRResources/articleID/190>>, accessed on 17 June 2004.
- Bannister, J. and K. Hill (2004). "Mortality in China, 1964-2000", *Population Studies*, vol. 58, No. 1, pp. 55-75.
- Chen, S.L and others (2002). "HIV/AIDS in China: Survey provides guidelines for improving awareness", *Asia-Pacific Population and Policy*, 62 (July), pp. 1-4.
- Dare, L. (2003). "WHO and the challenges of the next decade", *Lancet*, No. 361, pp. 170-171.
- De Souza, R.-M., J.S., Williams and F.A.B. Meyerson (2003). "Critical links: Population, health, and the environment", *Population Bulletin*, vol. 58, No. 3.
- Desbarats, J. (2003). "Adult mortality in the era of HIV/AIDS: Asia", paper presented at the Workshop on HIV/AIDS and Adult Mortality in Developing Countries, Population Division, Department of Economic and Social Affairs, United Nations Secretariat, New York, 8-13 September,
<http://www.un.org/esa/population/publications/adultmort/DESBARATSRev2_Paper5.pdf>.
- ESCAP (2004). *Report of the Subcommittee on Socially Vulnerable Groups*.
<<http://www.unescap.org/esid/committee2004/index.asp>>, accessed on 13 December 2004.
- Ezzati, M., A.D. Lopez, A. Rodgers, S.V. Hoorn, C.J.L. Murray and the Comparative Risk Assessment Collaborating Group (2002). "Selected major risk factors and global and regional burden of disease", *Lancet*, No. 360, pp. 1347-1360.
- Gragnotati, M., I.T. Elo and N. Goldman (1999). "New insights into the Far Eastern pattern of mortality", *Population Studies*, vol. 53, No. 1, pp. 81-95.
- Hill, K. (2003). "Adult mortality in the developing world: What we know and how we know it", paper presented at Training Workshop on HIV/AIDS and Adult Mortality in Developing Countries, Population Division, Department of Economic and Social Affairs, United Nations Secretariat, New York, 8-13 September,
<http://www.un.org/esa/population/publications/adultmort/HILL_Paper1.pdf>.
- Horiuchi, S. (1999). "Epidemiological transitions in human history", in *Health and Mortality: Issues of Global Concern*, proceedings of the Symposium on Health and Mortality, Brussels, 19-22 November 1997 (United Nations publication, Sales No. E.99.XIII.17).
- Jatrana, S. (2003). "Infant mortality in a backward region of North India: Does ethnicity matter?" Asian MetaCentre Research Paper Series, No. 14, Singapore, National University of Singapore.
- Kesteloot, H. (1999). "Nutrition, all-causes and cardiovascular mortality: Its possible modulations by other factors, especially physical exercise", in *Health and Mortality: Issues of Global Concern*, proceedings of the Symposium on Health and Mortality, Brussels, 19-22 November 1997 (United Nations publication, Sales No. E.99.XIII.17).
- Khabir A. (2001). "North Korean Government admits that health of children is very poor", *Lancet*, No. 357, p. 1684.
- (2003). "UN warns Asia-Pacific may not meet millennium health targets", *Lancet*, No. 361, p. 2056.
- Khanna, S.K. (1997). "Traditions and reproductive technology in an urbanizing north Indian village", *Social Science and Medicine*, vol. 44, No. 2, pp. 171-180.
- Knowles, J.C. (2000). "A look at poverty in the developing countries of Asia", *Asia-Pacific Population and Policy*, 52(January), pp. 1-4.

- Lopez, A. (2003). *Mortality and Morbidity and Poverty Reduction*, Asian Population Studies Series No. 158 (New York, United Nations).
- _____ (1999). "Alcohol and smoking as risk factors", in *Health and Mortality: Issues of Global Concern*, proceedings of the Symposium on Health and Mortality, Brussels, 19-22 November 1997 (United Nations publication, Sales No. E.99.XIII.17).
- Luther, N.Y., S. Thapa and S.B. Westley (1999). "Nepal survey shows that family planning saves lives", *Asia-Pacific Population and Policy*, 49(April), pp. 1-4.
- Menken, J., L. Duffy and R. Kuhn (2003). "Child-bearing and women's survival: New evidence from rural Bangladesh", *Population and Development Review*, vol. 29, No. 3, pp. 405-442.
- Morris, K. (2001). "Growing pains of East Timor: Health of an infant nation", *Lancet*, No. 357, pp. 873-877.
- Nishtar, S. (2002). "Prevention of coronary heart disease in South Asia", *Lancet*, No. 360, pp. 1015-1018.
- Ogawa, N. (2003). *Ageing Trends and Policy Responses in the ESCAP Region*, Asian Population Studies Series No.161 (New York, United Nations).
- Pacquet, C. and G. Hanquet (1998). "Control of infectious diseases in refugee and displaced populations in developing countries", *Bulletin of the Institute of Pasteur*, No. 96, pp. 3-14.
- Pathmanathan, I., J. Liljestrand, J.M. Martins, L.C. Rajapaksa, C. Lissner, A. de Silva, S. Selvaraju and P.J. Singh (2003). *Investing in Maternal Health: Learning from Malaysia and Sri Lanka* (Washington DC, World Bank).
- Santow, G. (1999). "The mortality, epidemiological and health transitions: Their relevance for the study of health and mortality", in *Health and Mortality: Issues of Global Concern*, proceedings of the Symposium on Health and Mortality, Brussels, 19-22 November 1997 (United Nations publication, Sales No. E.99.XIII.17).
- Tay, J.H., K.Y. Show and C.H. Lua (n.d.). "Water conservation in the Asia Pacific: A review with focus on pollution and its counter measures", unpublished paper.
- Thang, M.N. and B.M. Popkin (2003). "Income and health dynamics in Vietnam: Poverty reduction, increased health inequality", *Population*, vol. 58, No. 2, pp. 253-264.
- Tunstall-Pedoe, S. and others (2003). "Prevention of coronary artery disease: The South Asian paradox", *Lancet*, No. 361, pp. 79-80.
- UNAIDS (United Nations Joint Programme on HIV/AIDS) (2004). *2004 Report on the Global AIDS Epidemic, 4th Global Report* (Geneva, UNAIDS).
- UNEP (2001). *Asia-Pacific Environment Outlook 2*, <<http://www.rrcap.unep.org/reports/apo2.cfm>>, accessed on 28 August 2004.
- UNEP (2004). *GEO: Global Environment Outlook 3: Past, Present and Future Perspectives*. <<http://www.unep.org/GEO/geo3/english/286.htm>>, accessed on 26 August 2004.
- United Nations (2003a). *World Population Prospects: The 2002 Revision, Volume I, Comprehensive Tables* (United Nations publication, Sales No. E. 03.XIII.6).
- United Nations (2003b). *Promoting the Millennium Development Goals in Asia and the Pacific: Meeting the Challenges of Poverty Reduction ESCAP and UNDP*.
- United Nations Development Programme (UNDP) (2004). *Human Development Report 2004* (New York, United Nations).
- Valkonen, T. (1999). "The widening differentials in adult mortality by socio-economic status and their causes", in *Health and Mortality: Issues of Global Concern*, proceedings of the Symposium on Health and Mortality, Brussels, 19-22 November 1997 (United Nations publication, Sales No. E.99.XIII.17).

- Victora, C.G., A. Wagstaff, J.A. Schellenberg, D. Gwatkin, M. Claeson, and J.-P. Habicht (2003). "Applying an equity lens to child health and mortality: More of the same is not enough", *Lancet*, No. 362, pp. 233-241.
- Visaria, L. (2004). "Mortality trends and the health transition" in T., Dyson, R. Cassen and L. Visaria, eds., *Twenty-first Century India: Population, Economy, Human Development, and the Environment* (Oxford, Oxford University Press).
- Wadley, S. (1993). "Family composition strategies in rural north India", *Social Science and Medicine*, vol. 37, No. 11, pp. 1367-1376.
- Westley, S.B. (1999). "Thailand copes with HIV/AIDS", *Asia-Pacific Population and Policy*, 50(July), pp. 1-4.
- Westley, S.B. and V.K. Mishra (2001). "Although the situation is improving, women and children still face serious health problems in India, *Asia-Pacific Population and Policy*, 56(January), pp. 1-4.
- WHO (2003). *World Health Report 2003: Shaping the Future* (Geneva, World Health Organization), <<http://www.who.int/whr/2003/en/>>, accessed on 28 August 2004.
- WHO, UNICEF and UNFPA (2004). *Executive Summary of Maternal Mortality in 2000: Estimates Developed by WHO, UNICEF and UNFPA*, <http://www.who.int/reproductivehealth/publications/maternal_mortality_2000/executive_summary.html>, accessed on 10 July 2004.
- Woodward, M. and M.A. Reid (2003). "Cardiovascular disease in the Asia-Pacific region: Challenges for health research and policy, *Medical Journal of Australia*, vol. 179, No. 2, pp. 71-72.
- World Health Organization (n.d.). "Tuberculosis". <<http://www.who.int/mediacentre/factsheets/fs104/en/>>, accessed on 4 August 2004.
- Xiang B. and T. Wong (2003). *SARS: Public Health and Social Science Perspectives*, SARS Roundtable, <<http://www.ari.nus.edu.sg/docs/SARS.pdf>>, accessed on 28 July 2004.
- Zeng, Y., J.W. Vaupel, Z. Xiao, C. Zhang and Y. Liu (2001). "The healthy longevity survey and the active life expectancy of the oldest old in China". *Population*, vol. 13, No. 1, pp. 95-116.

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Chapter II

Health Transition in Asia: Implications for Research and Health Policy

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Asia is marked by diversity in terms of history, ethnicity, religion, cultural traditions, geography, economy and demography. Health and mortality conditions, naturally, are also diverse across the region. In most Asian countries, the level of mortality fell substantially over the last 50 years. As mortality falls from high to low levels, morbidity patterns also change. High levels of overall mortality are associated with relatively high mortality among infants and children, and the major causes of death are communicable diseases, maternal and perinatal conditions and nutritional deficiencies. Low levels of mortality are associated with very low levels of mortality until old age, and non-communicable diseases constitute the major causes of death.

This paper examines the trends in mortality levels and associated health issues in Asian countries¹ within the health transition framework. Based on them, health policies and programmes as well as challenges for future research will be discussed.

THE DEMOGRAPHIC TRANSITION

The health transition is imbedded within the demographic model describing the shift from high to low levels of mortality and fertility. Table 1 shows the classification of countries in Asia by levels of mortality and fertility. Most countries in Asia have reached only the middle of the demo-

graphic transition, while others, mainly those in East Asia, have already completed the demographic transition, which means that fertility levels are well below the replacement level, and the expectation of life at birth exceeds 73 years. In contrast, many countries in South-Central Asia are still in the early stage of the demographic transition: women typically have more than four children and their life expectancy is less than 60 years.

In general, countries with high levels of fertility also have high levels of mortality and countries with low levels of fertility have low levels of mortality, although some exceptions have been observed. China's level of fertility is one of the lowest but its level of mortality tends to be relatively high. Apparently, the very strong national family planning programmes in China since the late 1970s, coupled with low levels of economic development, have contributed to this pattern (Riley, 2004). The pattern in Brunei Darussalam and Malaysia are the opposite, with very low levels of mortality and moderately high levels of fertility. Brunei Darussalam is a country with a small population size and high level of income, and the pattern is not surprising. The moderately high level of fertility in Malaysia is explained by the high level of fertility among ethnic Malay women owing to their sustained cultural value of high fertility, even among the highly educated (Devasahayam, 2004). Another exception is Myanmar, a poor country with very high levels of mortality and only moderately high levels of fertility. Its moderate fertility levels are mostly a result of relatively late age at marriage among men and women. The singulate mean age at marriage (mean age at marriage estimated from age-specific proportions of singles) in 1997 was 26.4 years for women and 27.5 for men. The high rates of induced abortion and long durations of

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¹ The geographic scope of the paper is limited to East Asia, South-Central Asia and South-East Asia.

breastfeeding have also resulted in relatively low levels of fertility in spite of the low prevalence of contraceptive use. In addition, the high rates of

induced abortion have also contributed to high levels of maternal mortality in Myanmar (Myanmar Department of Population, 1998).

Table 1. Classification of countries and areas in East Asia, South-Central Asia and South-East Asia by their total fertility rates and life expectancy in 2002

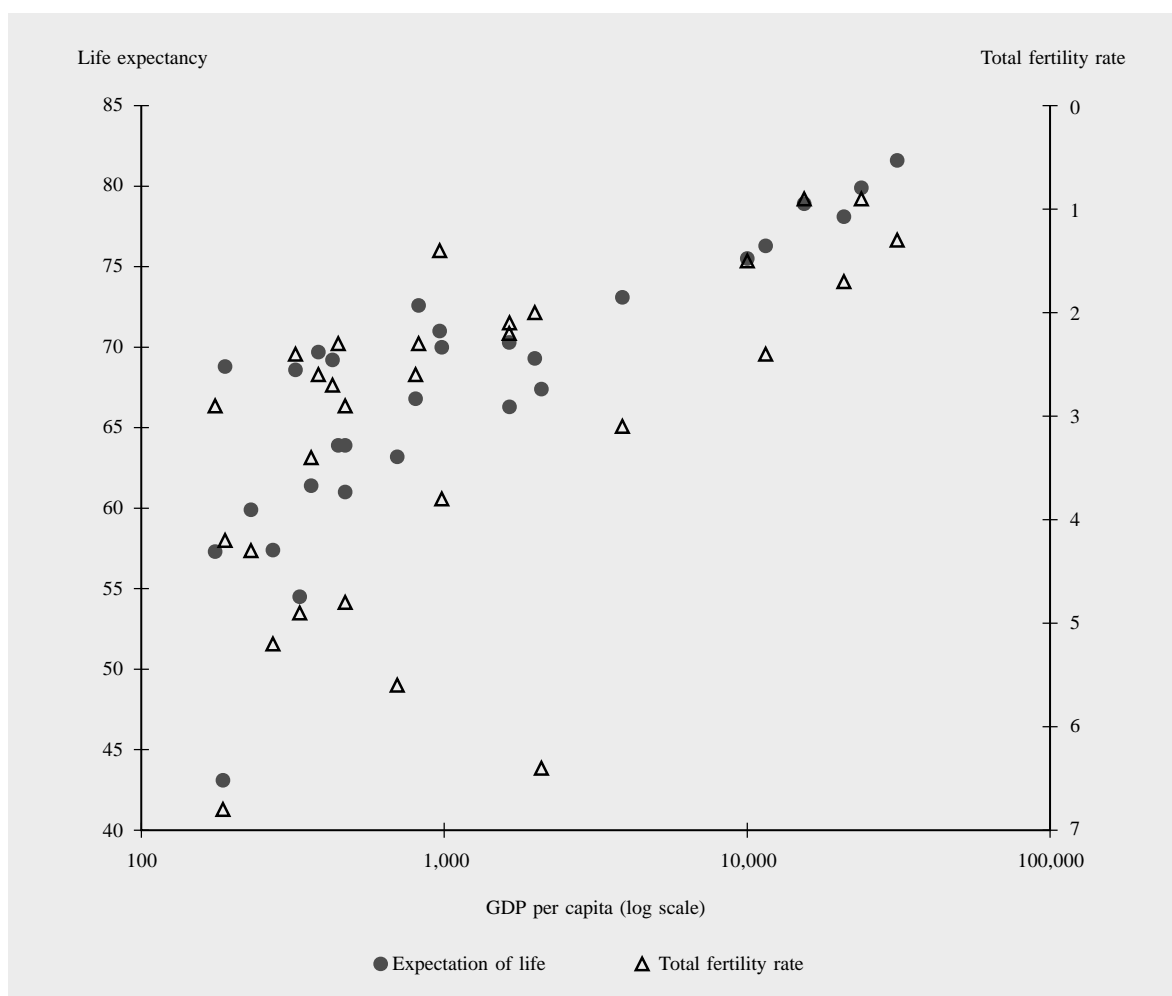
Life expectancy(years)	Total fertility rate			
	4.0 or more children	2.4-3.9	1.9-2.3	Less than 1.9
73.0 or more		Brunei Darussalam Malaysia		Hong Kong, China Macao, China Japan Republic of Korea Singapore
68.0-72.9	Tajikistan	Philippines Kyrgyzstan Uzbekistan Viet Nam	Iran (Islamic Republic of) Thailand Sri Lanka	China
60.0-67.9	Bhutan Maldives Pakistan	Bangladesh India Indonesia Turkmenistan	Democratic People's Republic of Korea Kazakhstan Mongolia	
Less than 60.0	Afghanistan Cambodia Timor-Leste Lao People's Democratic Republic Nepal	Myanmar		

Sources: United Nations (2004). *World Fertility Report 2003* (United Nations publication, Sales No. ESA/P/WP.189); United Nations (2003). *World Population Prospects: The 2002 Revision, vol. II, Sex and Age Distribution of Populations* (United Nations publication, Sales No. E.03.XIII.7); and International Institute for Population Sciences (IIPS) and ORC Macro (2000). *National Family Health Survey (NFHS-2), 1998-1999, India* (Mumbai: IIPS).

In general, fertility and mortality levels are closely related to the level of economic development in a country (United Nations, 1982; Bulatao and Lee, 1983). Figure 1 shows that this is the case for Asian countries. However, the relationship is stronger for mortality levels than for fertility levels. The relatively weak relationship between the level of economic development and the level of fertility is primarily due to the intervention of family planning programmes in lowering the fertility level in many Asian countries. Some Asian countries such as Bangladesh and Indonesia have received substan-

tial foreign assistance for their family planning programmes in the past 50 years. In some other countries such as China, family planning programmes have been implemented with an exceptionally large share of national resources. Thus, the relationship between GDP and total fertility shows large variations. On the contrary, the national commitments to health-care programmes in general vary less across countries and have received less international assistance. Therefore, general levels of mortality are more closely related to national economic levels.

Figure 1. Scattergram showing associations between life expectancy and GDP per capita and total fertility rate and GDP per capita in 2002 in selected Asian countries

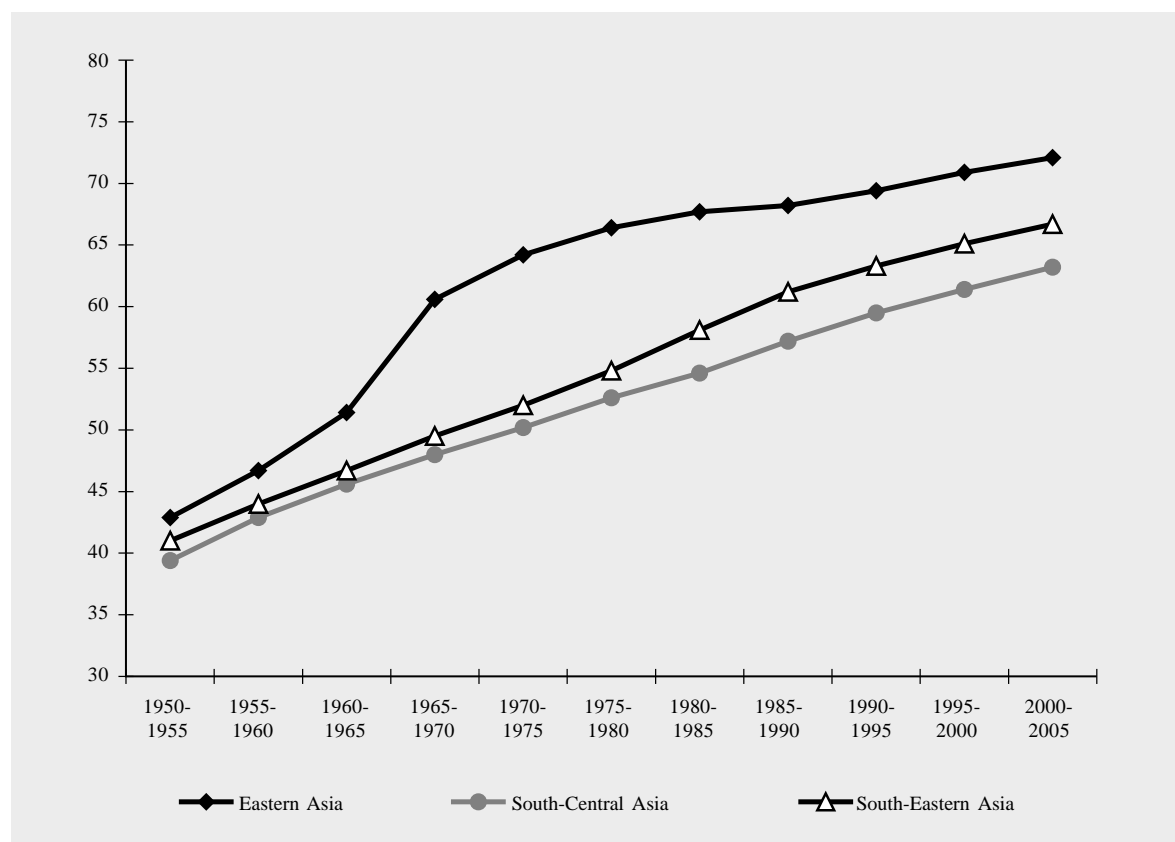


Sources: United Nations (2003). *World Population Prospects: The 2002 Revision, vol. II, Sex and Age Distribution of Populations* (United Nations publication, Sales No. E.03.XIII.7); United Nations (2004). *World Fertility Report 2003* (United Nations publication, Sales No. ESA/P/WP); and ESCAP (2003) *Asia-Pacific in Figures 2002*.

II. THE HEALTH TRANSITION

Fifty years ago, the regional differential in life expectancy was not large (figure 2). During the past 50 years, however, substantial differences in life expectancy began to show up in the region. Of the three subregions in Asia under consideration, the improvement is larger in East Asia than South-Central Asia, with South-East Asia being in the middle. This pattern parallels the economic development of the countries in the three subregions.

At the country level, the variations in life expectancy as well as the gains in life expectancy in recent years are very large. Table 2 summarizes the gains in life expectancy during the last 50 years. According to United Nations estimates, life expectancy was less than 50 years in many countries in these three subregions in the period 1950-1955, while only four countries (out of 32) had a life expectancy of more than 60 years. During the ensuing 50 years, life expectancy increased by about 20 years on average.

Figure 2. Trends in life expectancy in three Asian subregions, 1950-1955 to 2000-2005

Source: United Nations (2003). *World Population Prospects: The 2002 Revision, vol. II, Sex and Age Distribution of Populations* (United Nations publication, Sales No. E.03.XIII.7).

Note: The following are included in the "eastern Asia" subregion: China; Hong Kong, China; Democratic People's Republic of Korea; Japan; Macau; Mongolia; Republic of Korea. The "south-central Asia" subregion: Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Kazakhstan, Kyrgyzstan, Maldives, Nepal, Pakistan, Sri Lanka, Tajikistan, Turkmenistan; Uzbekistan. The "south-eastern Asia" subregion: Brunei Darussalam, Cambodia, East Timor, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand; Viet Nam. The "western Asia" subregion: Armenia, Azerbaijan, Bahrain, Cyprus, Gaza Strip, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Turkey, United Arab Emirates; Yemen.

The increase is more spectacular in some countries than in others. In a number of countries, life expectancy increased by more than 25 years while in many others, the increase was less than 15 years. The differences in the increase in the life expectancy across these Asian countries is likely due to variations in factors such as improvements in sanitation, economic development, fertility decline and access to preventive and curative health care. The largest increase in life expectancy was achieved by China where levels increased by more than 30 years. The smallest increase is seen in countries of the former Union

of Soviet Socialist Republics (USSR), and countries characterized by extreme poverty such as Afghanistan and the Democratic People's Republic of Korea.

As the level of mortality declines, the major causes of death and disability shift from communicable diseases and maternal and perinatal complications to the chronic, non-communicable diseases of old age. This pattern, commonly known as the epidemiological transition, is illustrated by the changes in the five leading causes of death in Japan where the life expectancy increased from 45.9 years

Table 2. Classification of countries and areas in East Asia, South-Central Asia and South-East Asia by expectation of life, in period 1950-1955 and gain in life expectancy between the periods 1950-1955 and 2000-2005

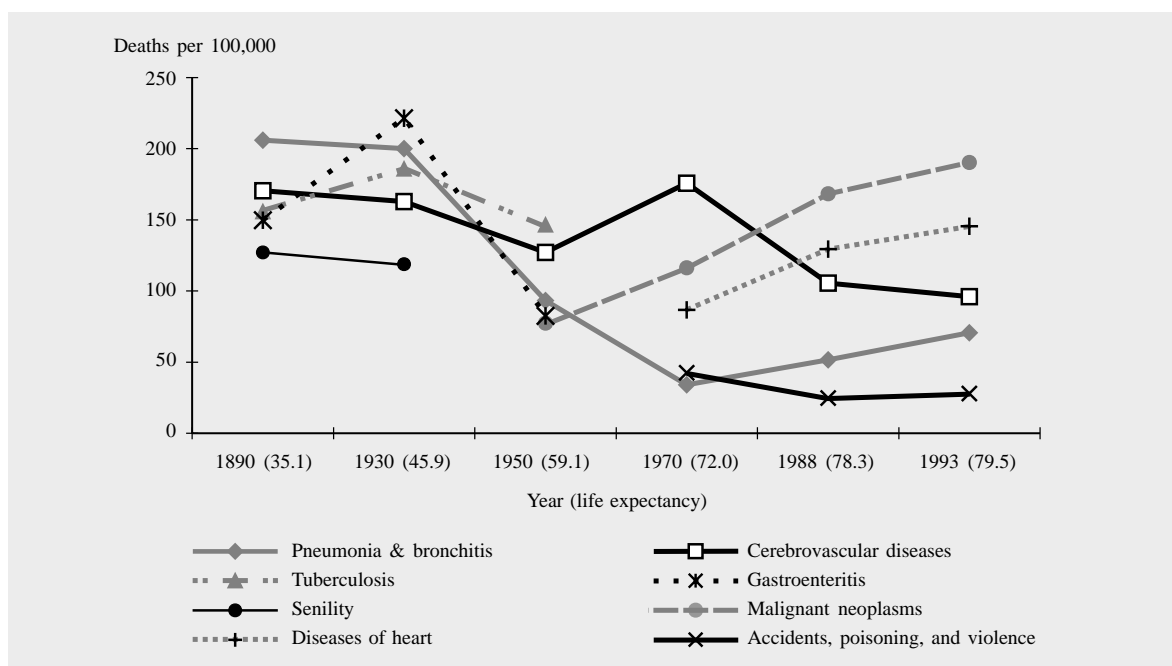
<i>Life expectancy in 1950-1955</i>	<i>Gain in life expectancy between 1950-1955 and 2000-2005</i>			
	<i>Less than 15 years</i>	<i>15-19 years</i>	<i>20-24 years</i>	<i>25 years or more</i>
60 and higher		Brunei Darussalam Hong Kong, China Japan Singapore		
50-59	Kazakhstan Kyrgyzstan Tajikistan Turkmenistan Uzbekistan	Sri Lanka Thailand	Macao, China	
40-49	Democratic People's Republic of Korea		Mongolia Pakistan	China Iran (Islamic Republic of) Republic of Korea Viet Nam
Under 40	Afghanistan	Cambodia Timor-Leste Lao People's Democratic Republic	Bangladesh Nepal Myanmar	Bhutan India Indonesia Maldives

Source: United Nations (2003). *World Population Prospects: The 2002 Revision, vol. II, Sex and Age Distribution of Populations* (United Nations publication, Sales No. E.03.XIII.7).

in 1930 to 79.5 years in 1993 (figure 3). In 1930, the five leading causes of death were: (a) gastroenteritis, (b) pneumonia and bronchitis, (c) tuberculosis, (d) cerebrovascular diseases and (e) senility. In contrast, in 1993, they were: (a) malignant neoplasms, (b) heart disease, (c) cerebrovascular diseases, (d) pneumonia and bronchitis and (e) accidents, poisoning and violence. However, two causes of death, namely, cerebrovascular diseases and pneumonia and bronchitis, have at all times been two of the five leading causes. Even in high mortality situations, more people die at older ages than at younger ages, and cerebrovascular diseases, which tend to be the diseases of old age, cause large proportions of deaths at all stages of the epidemiological transition. In contrast, death as a result of pneumonia and bronchitis is more common among younger people in countries at the early stages of the epidemiological transition and among older people in countries at the later stages of the transition.

The age pattern of mortality changes as well during the mortality and epidemiological transition. When overall mortality is high, deaths occur most frequently during the first few years of life but when the overall mortality is low, most deaths occur at the older ages. In Japan, about 20 per cent of newborn babies were dying before reaching age five in 1890, but in 1982, less than 5 per cent were dying before age five (Nanjo and Kobayashi, 1985).

Shifts in the major causes of death can be seen in the cross-sectional data from countries with different levels of mortality. Table 3 shows mortality by major causes of death in the broad categories of World Health Organization (WHO) regions and mortality strata in Asia. In South-East Asian countries with high levels of mortality, communicable diseases, maternal and perinatal complications and nutritional deficiencies constituted more than 40 per cent of deaths in 2002. In WHO Western Pacific countries with very low levels of mortality, deaths

Figure 3. Death rates by five leading causes of death in Japan, 1890-1993

Sources: International Medical Foundation of Japan (1997). *Recent Trends in Health Statistics in Southeast Asia 1974-1993* (Tokyo, Southeast Asian Medical Information Center, International Medical Foundation of Japan); Z. Nanjo and K. Kobayashi (1985). *Cohort Life Tables Based on Annual Life Tables for the Japanese Nationals Covering the Years 1891-1982*, NUPRI Research Paper Series No. 23 (Tokyo: Nihon University Population and Research Institute).

Table 3. Percentage distribution of deaths, by cause, in selected WHO regions and mortality strata, 2002

Cause	South-East Asia		Western Pacific	
	High mortality	Low mortality	Low mortality	Very low mortality
Communicable diseases, maternal and perinatal conditions, and nutritional deficiencies	41	29	15	11
Non-communicable conditions	49	61	75	82
Injuries	10	10	11	7
Total	100	100	100	100

Source: WHO (2004). *The World Health Report 2004* (Geneva: WHO), annex table 2.

Note: The WHO classification of high mortality countries in South-East Asia include Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Maldives, Myanmar, Nepal and Timor-Leste; low mortality countries in South-East Asia include Lao People's Democratic Republic, Malaysia, Philippines, Republic of Korea and Viet Nam; low mortality countries of the WHO Western Pacific Region include Indonesia, Sri Lanka and Thailand; and very low mortality countries of that Region include Japan and Singapore.

due to these causes constituted only 11 per cent of deaths. On the contrary, non-communicable conditions were responsible for less than half the deaths in high-mortality countries in South-East Asia, while these diseases were responsible for more than 80 per cent of deaths in countries with very low mortality in the WHO Western Pacific region.

As the major causes of death shift from communicable diseases to non-communicable conditions during the mortality transition, major risk factors shift from those originating with poverty and underdevelopment to conditions associated with lifestyle and environmental changes. In high mortality countries in South-East Asia, 10 major risk

factors associated with mortality include childhood underweight, unsafe drinking water, indoor air pollution and iron deficiency. These risk factors are closely related to poverty. While these conditions no longer constitute the 10 major risk factors in WHO Western Pacific countries with very low mortality, they continue to be found among Asian countries with low mortality (WHO, 2002; table 10).

Some risk factors are listed under the 10 leading causes of death only in the WHO Western Pacific countries with very low mortality. They are urban air pollution, occupational exposure to carcinogens and overweight. All of these causes are closely related to lifestyle and consumption patterns. Some risk factors appear among the 10 leading causes of death in both high-mortality and low-mortality countries: tobacco, alcohol, blood pressure, high cholesterol levels, low intake of fruits and vegetables, physical inactivity and unsafe sex. These factors are closely related to patterns of consumption and lifestyle as well.

In summary, during the epidemiological transition, major risk factors of mortality shift from being associated with poverty to being associated with consumption and lifestyle. Lowering the common risk factors, such as tobacco and alcohol use, blood pressure, high cholesterol levels, low intake of fruits and vegetables, physical inactivity and unsafe sex, will result in improvements in health conditions and a reduction of mortality in Asia in the near future.

III. UNDER-FIVE MORTALITY AND THE MILLENNIUM DEVELOPMENT GOALS

As recently as in 2002, under-five mortality was still high in many Asian countries. WHO estimates that in many Asian countries such as Afghanistan, Cambodia, Lao People's Democratic Republic, Timor-Leste, Myanmar and Pakistan more than 10 per cent of the children die before reaching age 5 (WHO, 2004). In these countries, a large proportion of young children die from preventable and curable causes such as unsanitary birth conditions and childhood communicable diseases. The underlying risk factors of these diseases include childhood underweight, deficiencies in micronutri-

ents among pregnant women and children, both of which are associated with poverty. Some of these risk factors may be eradicated by public health measures such as immunization against childhood diseases, micronutrient supplementation and home treatment of diarrhoea.

Recognizing the importance of preventive measures to reduce under-five mortality, the International Monetary Fund (IMF), Organisation for Economic Co-operation and Development (OECD), United Nations and the World Bank Group (WBG) have jointly included reducing under-five mortality by two thirds in 25 years starting from 1990 as one of their goals; this is also one of the Millennium Development Goals (MDGs) adopted in 2000 (IMF and others, 2000). The year 2002 marks the halfway point for achieving the MDGs. According to World Bank estimates, 11 of the 32 countries in East Asia, South-Central Asia and South-East Asia had not even achieved a 25 per cent decline in mortality by 2002 (table 4). Most of these countries, except for Kazakhstan and China, are very poor. Two questions arise in examining the table: How can the very poor countries achieve the MDGs? Why are Kazakhstan and China lagging behind in achieving the MDGs? An attempt to answer these questions begs an examination of the risk factors associated with under-five mortality in these Asian countries.

The major risk factors of under-five mortality are highly correlated with each other. In order to identify the risk factors with statistically significant net effects on under-five mortality in Asian countries, a stepwise regression model was run using a number of risk factors as potential predictor variables: GDP per capita (log scale); national health expenditure per capita; women's literacy; percentage of households with clean drinking water and sanitary facilities, percentage of one-year-olds who were vaccinated against measles; percentage of births assisted by trained health professionals, total fertility rate; and fertility rate among women under age 20. The data were assembled from the most recent statistics reported by the United Nations (2004a and 2004b), WBG (2004), and WHO (2004). The model identified two factors that have statistically significant net effects on under-five mortality: GDP per capita and percentage of one-year-olds who are vaccinated against measles. The effects of these factors on under-five mortality are shown in table 5.

Table 4. Countries with less than a 25 per cent decline in under-five mortality between 1990 and 2002, with selected indicators of child immunization and poverty

	<i>Under-five mortality (per 1,000)</i>		<i>Percentage of children immunized against measles</i>		<i>GDP per capita in US dollars</i>		<i>Percentage of population living on less than US\$1/day</i>
	1990	2002	1990	2002	1990	2002	2002
Afghanistan	260	257	20	44	376	186	–
Cambodia	115	138	34	52	104	272	34.1
Timor-Leste	160	126	–	–	375	–	–
Myanmar	130	108	90	75	68	175	–
Pakistan	130	104	50	57	424	471	13.4
Turkmenistan	97	98	–	88	653	–	12.1
Kazakhstan	67	76	–	95	–	1,642	<2
Tajikistan	78	72	–	84	115	189	10.3
Uzbekistan	62	68	–	97	454	384	21.8
Democratic People's Republic of Korea	55	55	–	–	842	–	–
China	49	38	98	65	312	966	16.6

Source: World Bank Group (2004). *World Development Indicators 2004* (Washington DC: World Bank Group).

Note: – indicates no information available.

The table shows expected under-five mortality under the hypothesis of the percentage of one-year-olds who are vaccinated against measles and the hypothesis of GDP per capita leaving unchanged the other conditions listed above.

In 1990, under-five mortality in East Asia was 44 deaths per 1,000 births. The previously

mentioned MDG calls for a two third reduction by 2015 to the level of 15 deaths per 1,000 births. Table 5 indicates that the goal could be achieved by attaining 100 per cent coverage of measles vaccination and GDP per capita of about US\$ 3,000. In South-East Asia, under-five mortality was 77 deaths per 1,000 births in 1990. A two third reduction by 2015 means reducing the level to 26 deaths per

Table 5. Estimated under-five mortality under hypothetical GDP per capita and percentage of one-year-olds who are vaccinated against measles

<i>GDP per capita (US dollars)</i>	<i>Percentage of one-year-old children who are vaccinated against measles</i>					
	50%	60%	70%	80%	90%	100%
<i>Estimated under-five mortality (per 1,000)</i>						
200	130	117	103	89	75	62
300	123	110	96	82	68	55
500	114	101	87	74	60	46
1,000	102	89	75	62	48	34
2,000	91	77	64	50	36	22
4,000	79	66	52	38	24	11
6,000	72	59	45	31	17	4
8,000	67	54	40	26	12	0

Notes: Estimated from a regression model using GDP per capita (in log-scale) and percentage of one-year-olds who are vaccinated against measles as predictor variables. The regression model is estimated using data from East Asia, South-Central Asia and South-East Asia, 2002, as reported in WHO (2003). *The World Health Report 2003 – Shaping the Future* (Geneva: WHO), annex table 7.

1,000 births. This, too, can be achieved by 100 per cent measles vaccination and about US\$ 1,500 GDP per capita. In South-Central Asia, under-five mortality was 125 per 1,000 in 1990; a two thirds reduction by 2015 would mean reducing the level to 42. Yet this, too, could be achieved by 100 per cent measles vaccination and GDP per capita over US\$ 500, or 90 per cent measles vaccination and GDP per capita over US\$ 1,000. However, it is obvious that this MDG will be difficult to achieve with less than 90 per cent coverage of measles vaccination or GDP per capita of US\$ 1,000.

A similar stepwise regression exercise on maternal mortality shows that the percentage of births attended by trained health professionals is the only factor that has a statistically significant net effect. The regression results indicate that a 10 per cent increase in the percentage of births attended by trained health professionals would result in a reduction of maternal mortality by 41 deaths per 100,000 births. The mean maternal mortality ratio in South-Central Asian countries was 374 deaths per 100,000 live births in 2002. In these countries, 40 per cent of births were attended by trained health professionals. Increasing the percentage of trained health professionals by an additional 40 per cent would result in a reduction of the maternal mortality ratio by 164 points, or to the level of 210 maternal deaths per 100,000 live births. More importantly, this exercise demonstrates that, in order to reduce maternal mortality, it is necessary to improve the maternal and child health services available to the majority of the population.

In some countries, achieving high levels of child immunization may be easier to achieve than high levels of income. The situation in Nepal, for example, illustrates that strong maternal and child health programmes can reduce under-five mortality substantially. Nepal is a very poor country with a GDP per capita of US\$ 230 in 2002 (ESCAP, 2003). Yet, under-five mortality declined by 32 per cent (about one half of the goal of a two thirds reduction) from 145 deaths per 1,000 live births in 1990 to 98 in 2002. Nepal's maternal and child health programmes in recent years have been regarded as a model for improving the health of young children and women and for reducing under-five mortality (United States Agency for International Development (USAID), 2003). The proportion of one-year-olds who are fully immunized more than doubled in 11 years, from 29 per cent of one-year-olds in 1991 to 60 per cent in 2002, and

the proportion of children 6-59 months who received vitamin A supplementation increased from 31 per cent in 1993/1994 to 100 per cent in 2001/2002. A key feature of the maternal and child health programme in Nepal is the network of female community health workers who are recruited locally and trained to provide basic health education to mothers as well as to distribute packages of oral dehydration salt and administer vitamin A capsules twice a year. Studies document that improvements in the maternal and child health programme coupled with a fertility decline have contributed significantly to the reduction of under-five mortality in Nepal (Khanal, 2002).

In summary, providing basic maternal and child health care to the population is a key factor in achieving the MDGs. In very poor countries, the provision of such health-care amenities cannot be achieved without international cooperation.

A. Under-five mortality in India

Indian data provide a unique window for understanding how changes in under-five mortality are related to changes in risk factors associated with varying economic and social conditions. National Family Health Surveys, conducted in 1992/1993 (NFHS-I) and in 1998/1999 (NFHS-2), collected information on the social and economic conditions, health, fertility and related issues from a large sample of households. Data were derived from 18 states of India (excluding Jammu and Kashmir and six small states in the north-eastern region of the country) consisting of representative samples that were large enough for state-level estimates of child mortality (International Institute for Population Studies (IIPS), 1995; and ORC Macro International, 2000).

The estimates of under-five mortality from the 1998/1999 survey ranged from a high of 138 deaths per 1,000 live births in Madhya Pradesh to a low of 19 in Kerala. Six states recorded an under-five mortality level of over 150 deaths per 1,000 live births while three states recorded fewer than 50 such deaths per 1,000 live births. Fertility rates and socio-economic conditions also varied greatly from state to state in India. For example, the total fertility rate varied from 1.8 to 4.6 children per woman, the illiteracy rate among women of reproductive ages ranged from 15 per cent to 65 per cent and coverage of childhood immunization among one-year-olds ranged from 11 per cent to 89 per cent.

In the six-year period between 1992/1993 and 1998/1999, under-five mortality declined by 13 per cent from 109.3 deaths per 1,000 live births to 94.9. In five states, the decline exceeded 25 per cent; these included high-mortality states such as Orissa and low-mortality states such as Himachal Pradesh and the Union Territory of Delhi. In five states, the decline was less than 10 per cent, and they include the high-mortality states such as Madhya Pradesh and Rajasthan and low-mortality states such as Goa. States with a large decline in under-five mortality also experienced a large decline in the total fertility rate (an average decline of 1.1 children per woman), and an increase (an average of 9.5 per cent) in the coverage of childhood immunizations. States with a slight decline or no decline in under-five mortality experienced a small decline in the total fertility rate (an average of 0.3 children per woman) and a small increase (an average of 4.2 per cent) in the coverage of childhood immunizations. Thus, the state-level variations in the decline of under-five mortality during the six-year period between 1992/1993 and 1998/1999 can be explained mostly by variations in the decline of fertility and improvements in immunization against childhood diseases.

B. Recent changes in health-care systems and mortality in China and Kazakhstan

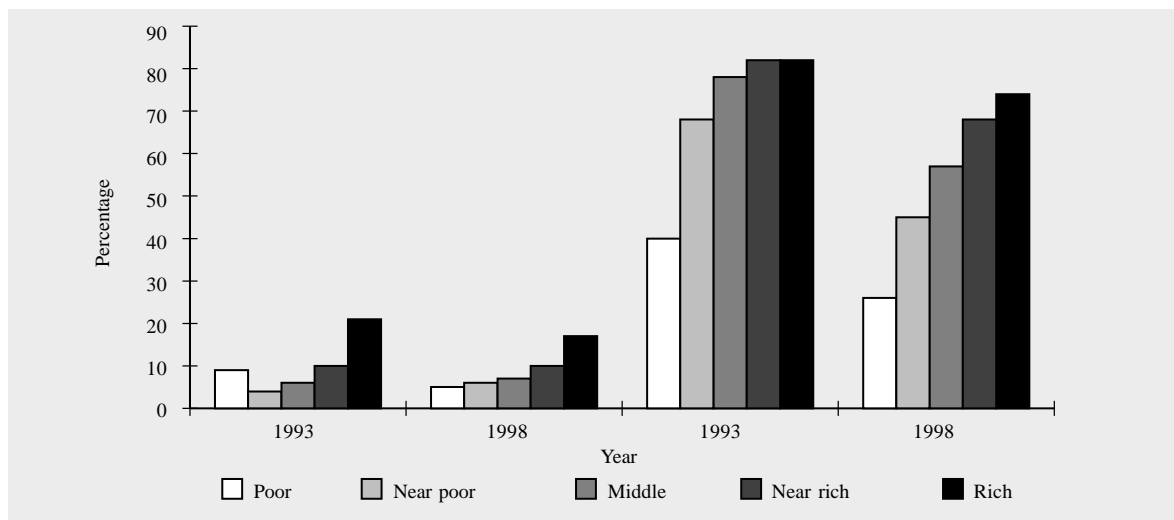
As shown previously (table 2), China achieved a remarkable improvement in the expectation of life between the period 1950-1955 and 2000-2005. During this time frame, infant mortality declined from 195 per 1,000 live births to 23 (Riley, 2004). The pace of decline, however, has been uneven. The decline since 1990 has been much slower than the decline during the period prior to 1990. This pattern is unexpected in view of the fact that economic development in China has accelerated since 1990. A closer examination shows that the public health system, which expanded to cover nearly all of the country's population in the 1960s and 1970s, together with a reduction in poverty and improvements in sanitation, has contributed greatly in reducing infant and child mortality during the period prior to 1990 (Banister and Hill, 2004). Measles vaccination, for example, reached 84 per cent of the country's children in 1984 and 98 per cent in 1990. During the 1960s and 1970s, 90 per cent of the rural population received at least basic health care (Riley, 2004).

The economic reform of the 1980s that brought about the accelerated pace of economic development in the 1990s resulted in changes in the health-care system in ways that widen mortality gaps among population groups. The pace of development of the health insurance system, for example, lagged behind the pace of the privatization of the health-care system. It is estimated that 90 per cent of rural residents did not have medical insurance in 1998 (figure 4). In urban areas, the coverage of medical insurance is higher than in rural areas. Although medical insurance coverage varies greatly by income level, the differentials increased substantially during the 1990s.

It must be noted, however, that the achievement of economic growth during the 1990s has been uneven across the country. The increase in income inequality indicated by trends in the Gini index is as phenomenal as the speed of the economic development of the country as a whole (figure 5). One of the adverse consequences of these socio-economic changes is the coverage of child immunizations. In 2001, only 79 per cent of children were immunized against measles, a drop of nearly 20 per cent since 1990 (Riley, 2004).

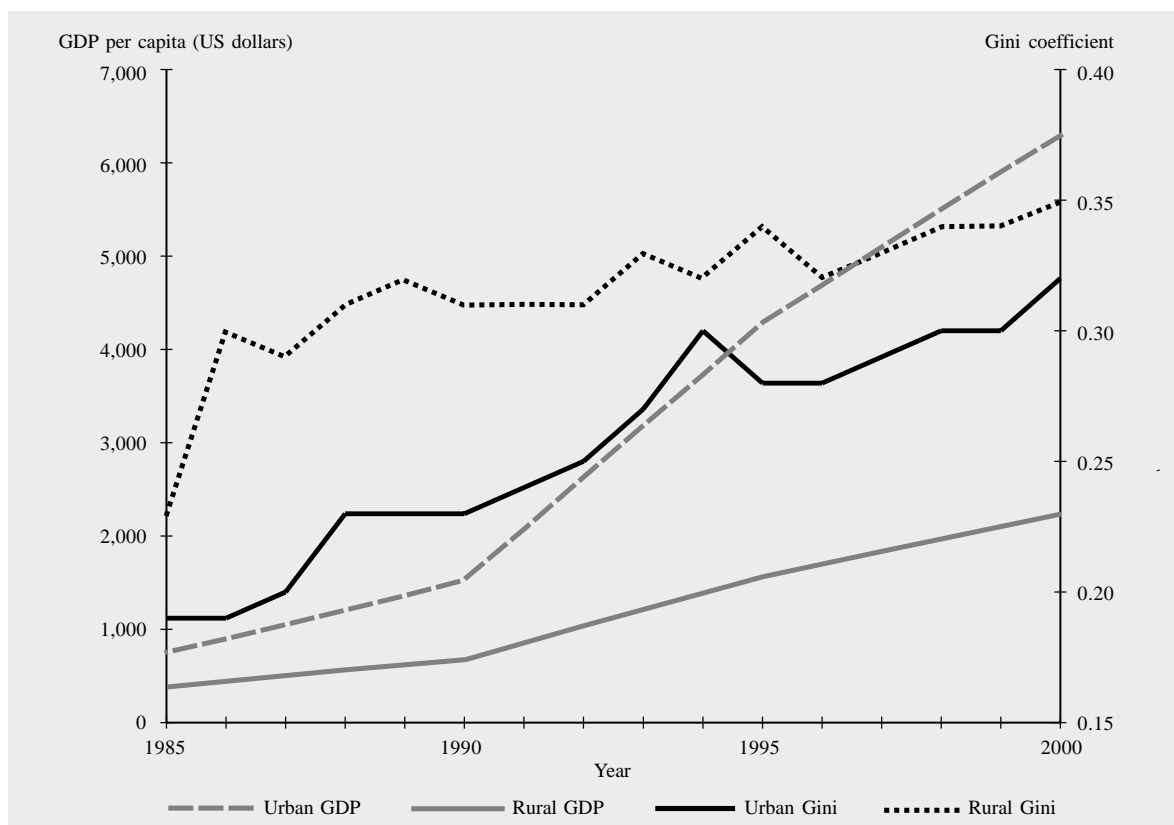
Before independence from the USSR in 1991, Kazakhstan's health-care system was part of the USSR's planned health-care system. At that time, the health-care system was successful in providing adequate services to most of its population. Soon after independence, however, Kazakhstan experienced a sharp economic contraction, and funding for public-health programmes was reduced drastically, resulting in increases in mortality and morbidity. To overcome the problem, the National Health Insurance System was launched in 1995, but it collapsed in 1999 as a result of inefficiency caused by mismanagement and corruption. Currently, the country is developing a new primary health-care system based on a network of family group practices with a sizeable loan from the World Bank (Academy of Preventive Medicine of Kazakhstan and Macro International Inc., 1999). Evidence shows that the collapse of the basic health-care system resulted in a slight increase in under-five mortality between 1991 and 2002. Achieving the MDG of reducing under-five mortality by two thirds by 2015 remains a difficult task for Kazakhstan to achieve.

Figure 4. Percentage of the population covered by health insurance, by income quintiles, in rural and urban parts of China, 1993 and 1998



Source: China Ministry of Health as cited in J. Gao, J. Qian, S. Tang, B. Erikson and E. Blas (2002). "Health equity in transition from planned to market economy in China", *Health Policy and Planning* 17(Suppl. 1): 20-29.

Figure 5. Trends in GDP per capita and Gini coefficients in urban and rural parts of China, 1985-2000



Sources: China State Statistical Bureau (2001) *Statistical Yearbook of China 2001* (Beijing: State Statistical Bureau); and T. He, X. Wang and F. Liu (2004). "Income inequality in China" (China National Institute of Law, Chinese Academy of Social Sciences, <<http://www.iolaw.org.cn>>, accessed on 12 August 2004).

IV. ECONOMIC DEVELOPMENT, SOCIAL CHANGE AND HEALTH TRANSITION

As causes of death change during the epidemiological transition from infectious diseases to chronic diseases, major underlying risk factors leading to these causes also change. As previously observed, risk factors of mortality in low-mortality countries are mainly behavioural or environmental. According to WHO reports, six of the nine major risk factors of mortality among men in Japan and Singapore are related to substance abuse (tobacco and excessive alcohol consumption) and food consumption (low fruit and vegetable intake, high blood pressure, high cholesterol levels and overweight). The same set of factors, except for alcohol abuse, constitutes five of the eight major risk factors of mortality among women in these countries. Other major risk factors include physical inactivity and air pollution (among men and women), occupational exposure to carcinogens (among men) and unsafe sex (among women) (WHO, 2002; table 10). As many countries in Asia are expected to enter the stage of very low mortality, these behavioural and environmental risk factors are bound to contribute to an increasing number of deaths. In this context, it is worth examining the prevalence and trends of these risk factors for the near future.

In 2000, the prevalence of smoking among men was very high in most Asian countries, unlike Europe and North America where more women than men were found to be smoking. The prevalence is especially high in East Asian countries where the majority of adult men currently are smokers (figure 6). In contrast, the prevalence of smoking among Asian women is very low and, as such, demographers have concluded that gender differences in mortality at older ages, especially in East Asian countries, are due to lifestyle differences between men and women (Goldman, 1980; 2004).

Studies on smoking behaviour in Asian countries indicate that economic development and social changes are likely to increase the prevalence of smoking even further. In many Asian developing countries, high socio-economic status of a family is associated with high levels of smoking among youth. In addition, young women in less traditional areas in Asia are more likely to smoke than women in more traditional areas (Choe and others, 2004).

These patterns indicate that the prevalence of smoking, especially among youth and women, is likely to increase in many Asian countries undergoing socio-economic development. Thus, one of the key public health concerns in Asia is to prevent adolescents and women from taking up the smoking habit.

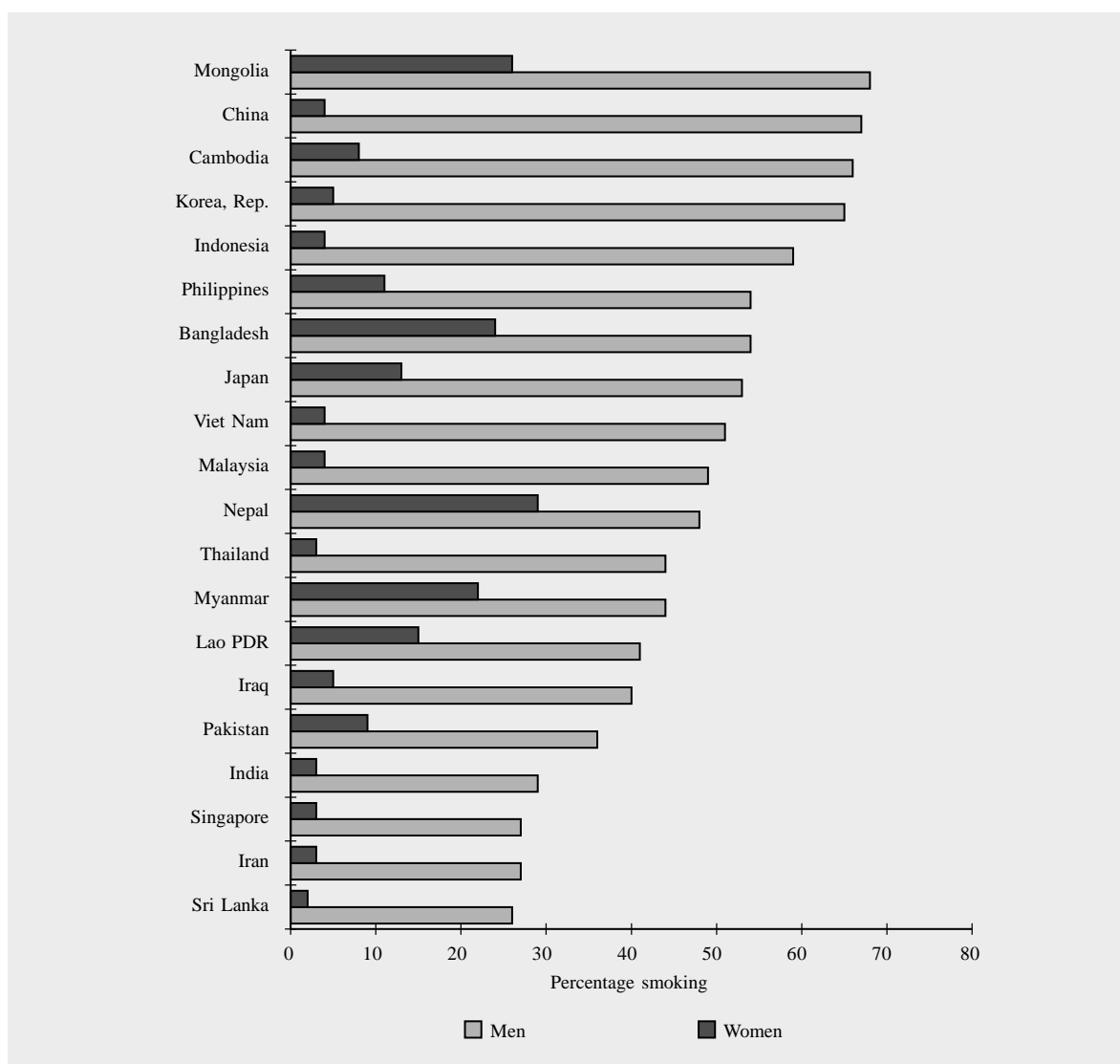
While developing economically, many countries in Asia are finding themselves in the epidemiological transition. As a result, major risk factors of mortality in many countries include both poverty-related risk factors and lifestyle-related risk factors. Table 6 shows that the prevalence of both undernourishment and overweight are substantial in many countries in Asia. These countries will have to deal with the double burden of solving poverty-related risk factors and lifestyle-related risk factors in the future. Efforts to reduce undernourishment among the poor as well as promote healthy eating habits among the economically better off segment of the population should be high on the public health agenda.

Table 6. Percentage undernourished and overweight in selected Asian countries

<i>Country</i>	<i>Percentage undernourished</i>	<i>Percentage overweight</i>
Malaysia	3	24
Republic of Korea	3	26
Iran (Islamic Republic of)	5	28
China	11	15
Pakistan	19	12
Thailand	19	13
India	21	5
Lao People's Democratic Republic	22	7
Philippines	22	17

Sources: World Bank Group (2004). *World Development Indicators 2004* (Washington DC, WBG); and UN Standing Committee on Nutrition (2004). *Fifth Report on the World Nutrition Situation* (Geneva: SCN), annex 6.

A study on diet change in China is illustrative. During the last half-century, there has been a rapid shift towards a pattern of food consumption linked with a high risk of non-communicable diseases (Popkin, 2002; Du and others, 2004). Between 1989 and 1998, the percentage of people consuming a high-fat diet (a diet with 30 per cent or more energy derived from fat) increased from 14 per cent to 38 per cent. During the same period, the

Figure 6. Prevalence of smoking by sex in selected countries in Asia and elsewhere, 2000

Source: World Bank Group (2004). *World Development Indicators 2004* (Washington DC, WBG).

proportion of adults aged 20-45 overweight or obese increased from 10 per cent to 15 per cent. Du and others (2004) found that the poor in China suffered a higher prevalence of non-communicable diseases than the rich because of changes in diet.

Air pollution is another major risk factor resulting in medium and low levels of mortality in Asian countries. Population growth and economic development will contribute to rising environmental risk factors, which will impinge on levels of mortality. In addition, increasing pollution is likely to result in an intensification of land use, increased

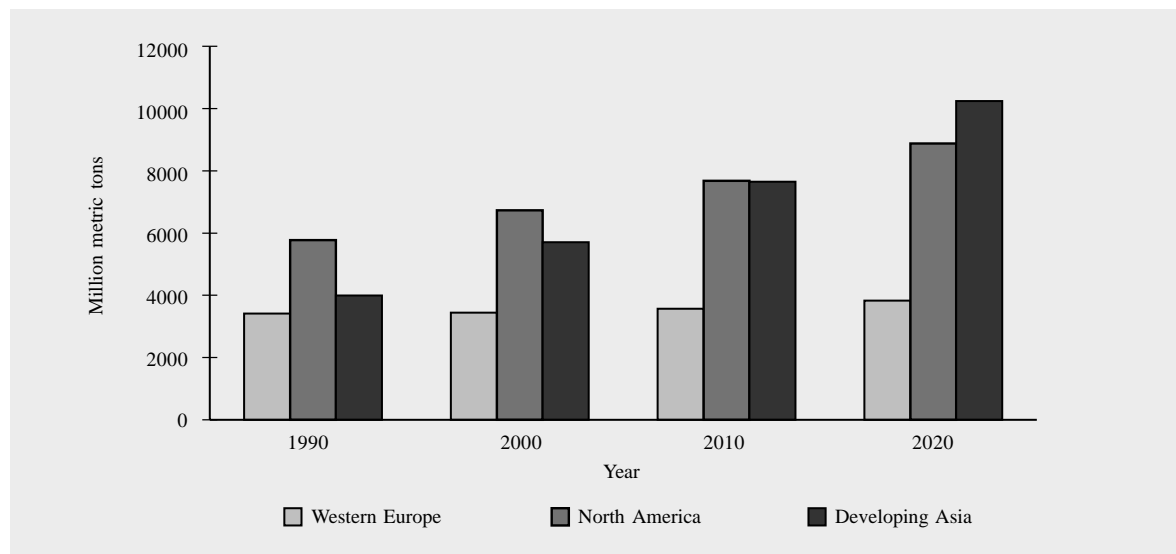
use of irrigated water and greater use of chemical fertilizers and pesticides. It is estimated that about one third of all cropland in Asia has been damaged by agricultural practices that are not sustainable. In addition, fresh water is becoming more scarce and polluted (Mishra, 2002).

Among the 15 large cities in the world with the worst levels of air pollution, 12 are in Asia. It has been projected that the situation is likely to get worse with rapid economic development as the demand for energy increases. For example, China's total energy consumption in 1999 was less than half

that of Western Europe. However, by 2020 China is expected to surpass Western Europe in its energy consumption (Mishra, 2002). Increasing energy consumption and the use of inefficient and polluting

technologies in large developing countries are expected to increase carbon emissions much more rapidly in Asia than in Western Europe and North America (figure 7).

Figure 7. Trends in carbon dioxide emissions by selected regions, 1990-2020



Source: Energy Information Administration (2004), *International Energy Outlook 2004*, table A9, <<http://www.eia.doe.gov/emeu/international/enviro.html#IntlCarbon>>.

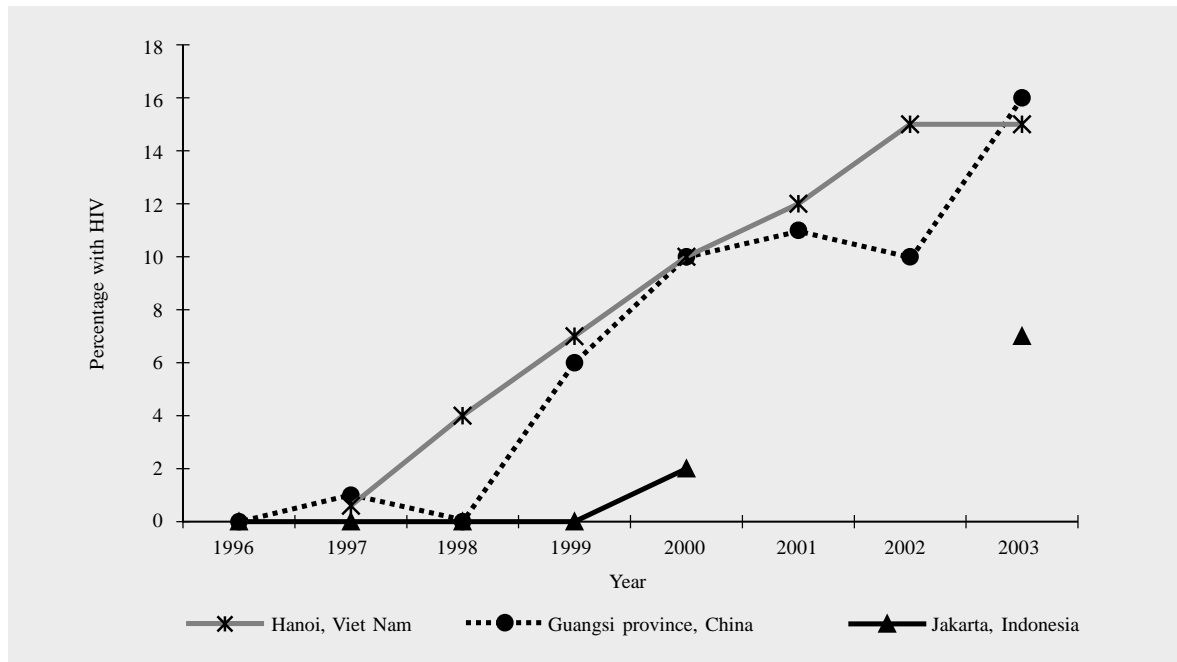
Unless significant measures are taken to incorporate environmental concerns into plans for agricultural development, urban planning, industrial growth and resource management, environmental health risks will worsen.

V. HIV/AIDS EPIDEMICS IN ASIA

The outbreak of HIV/AIDS began relatively late in Asia but at least three countries in South-East Asia now have serious HIV/AIDS epidemics. In Cambodia, Thailand and Myanmar, the estimated prevalence rates are over 1.5 per cent among adults. Many other countries seem to be in a transitional phase, with a rapidly growing HIV/AIDS prevalence in specific populations and regions, although the national levels may still be low. This group of countries includes China, India, Indonesia, the Islamic Republic of Iran, Japan, Nepal and Viet Nam (Brown, 2002; 2004).

HIV/AIDS seems to follow similar patterns in most Asian countries. It appears initially as a “sub-epidemic” in specific population groups. Some

sub-epidemics of HIV/AIDS in Asia have been described among groups such as the following: (a) men having sex with men; (b) injecting drug users; and (c) female sex workers. Many of the earliest HIV/AIDS cases in Cambodia, Malaysia, Myanmar and Thailand were among men who have sex with men, and there is strong evidence of extensive spread of HIV/AIDS in this group. In places such as India’s Manipur State, China’s Yunnan Province, Myiakyina in northern Myanmar, several urban areas in Thailand, Jakarta in Indonesia and some cities in Nepal, there have been reports of very high levels of HIV infection among injecting drug users ranging from 40 to 80 per cent. The prevalence of HIV/AIDS has risen rapidly among female sex workers in urban areas of China, India, Indonesia and Viet Nam in recent years (figure 8), as well as in Cambodia and Thailand where the prevalence was eventually reduced though prevention efforts (Brown, 2002). In parts of China, HIV/AIDS has also spread because of improper blood-selling procedures (China Ministry of Health and United Nations Theme Group on HIV/AIDS in China, 2003).

Figure 8. Trends in HIV prevalence among female sex workers in selected Asian sentinel sites: 1996-2003

Source: Monitoring the AIDS Pandemic Network (2004). *AIDS in Asia: Face the Facts*, <http://www.mapnetwork.org/reports.aids_in_asia.html>, p. 22.

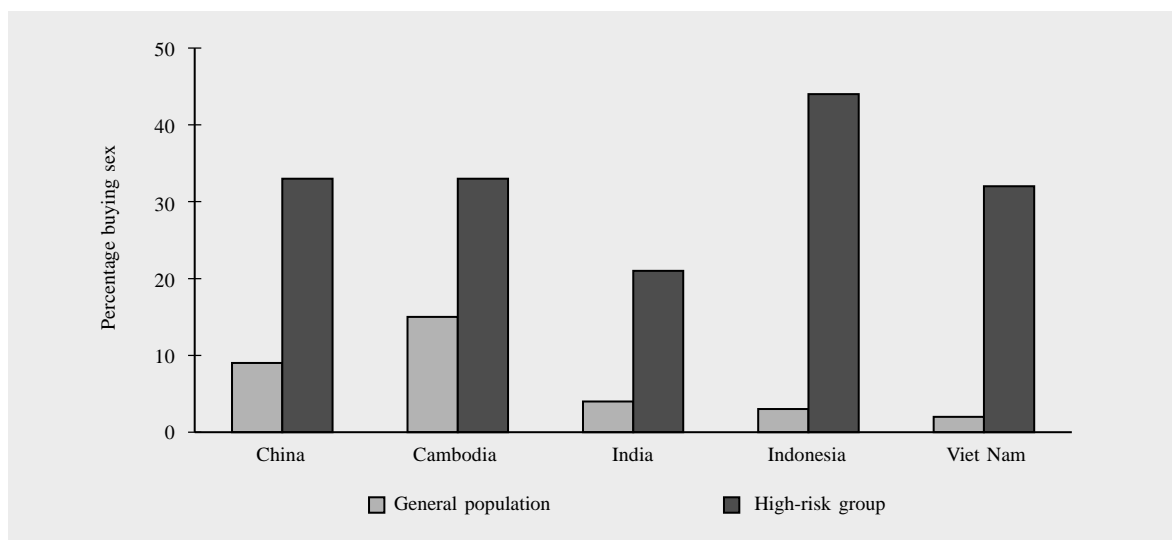
Behavioural studies have shown clear links among these sub-epidemics, and the link between the sub-epidemics and the spread of HIV infection to the general population. Many men who have sex with men also have sex with female partners. Many injecting drug users visit sex workers, and some sex workers use drugs. Most clients of sex workers also have other sexual partners. Blood donors who have become infected with HIV have sexual relationships with their spouses and other partners. With the increasing prevalence of HIV infection among sex workers, the potential risk of an AIDS epidemic spreading to the general population through men who have unprotected sex with sex workers increases as these men are more likely to infect their wives and other sexual partners, as well as children (Brown, 2004).

In many Asian countries, buying sex is not rare among men in general. Studies have found that among men in some “high-risk” groups in Asia, paying for sexual services is very common. Recent surveys indicate that truck drivers in Indonesia, India’s Tamil Nadu State, and Viet Nam; policemen in Cambodia; and sailors in Indonesia, for example, are much more likely to “buy sex” from female commercial sex workers than men in the general

population (figure 9). In Asia, where the attitude towards non-marital sexual behaviour is well tolerated for men but not for women, the demand for commercial sex is strong. The uneven pace of economic development in different parts of some countries (China and India, for example) seem to increase the prevalence of commercial sex as well (Brown, 2002; Zhang, Ma and Xiu, 2004) as some poor women resort to selling sex as an economic means for survival.

While the potential exists, it is difficult to predict if and when the HIV/AIDS epidemic will begin to expand in specific Asian countries and how quickly HIV infections will rise. It has been observed that injecting drug users and men having sex with men can spread HIV very quickly, raising infection levels in the affected group from zero to 20-40 per cent in as short a time as one year. The spread of HIV/AIDS among sex workers and their clients is strongly influenced by the number of clients who typically visit a sex worker each day (Brown, 2002). The spread of HIV/AIDS in the general population greatly depends on the behaviours linking the various sub-epidemic subgroups as well as the extent of the prevalence of HIV infection among these subgroups.

Figure 9. Percentage of men “buying sex” in the previous 12 months among groups representing the general population and those in “high-risk” groups, circa 2001



Source: Monitoring the AIDS Pandemic Network (2004). *AIDS in Asia: Face the Facts*, <http://www.mapnetwork.org/reports.aids_in_asia.html>, p. 38.

Note: “High-risk” groups refer to truck drivers in India, Indonesia and Viet Nam; police, in Cambodia; and sailors, in Indonesia.

VI. POPULATION AGEING AND HEALTH-CARE COSTS

The number of people aged 65 and older in Asia is expected to grow dramatically in the next 50 years. According to United Nations estimates, the older population (65 years and older) in the region as a whole will quadruple (figure 10). In South-East Asia, the number is expected to grow more than five times (table 7). Most countries in East Asia and South-East Asia will become “aged” populations, with at least a 15 per cent or higher proportion of their populations in the 65 and older age group. By 2050, populations in Japan, the Republic of Korea and Singapore will become more “aged” than many of the countries in Europe and North America.

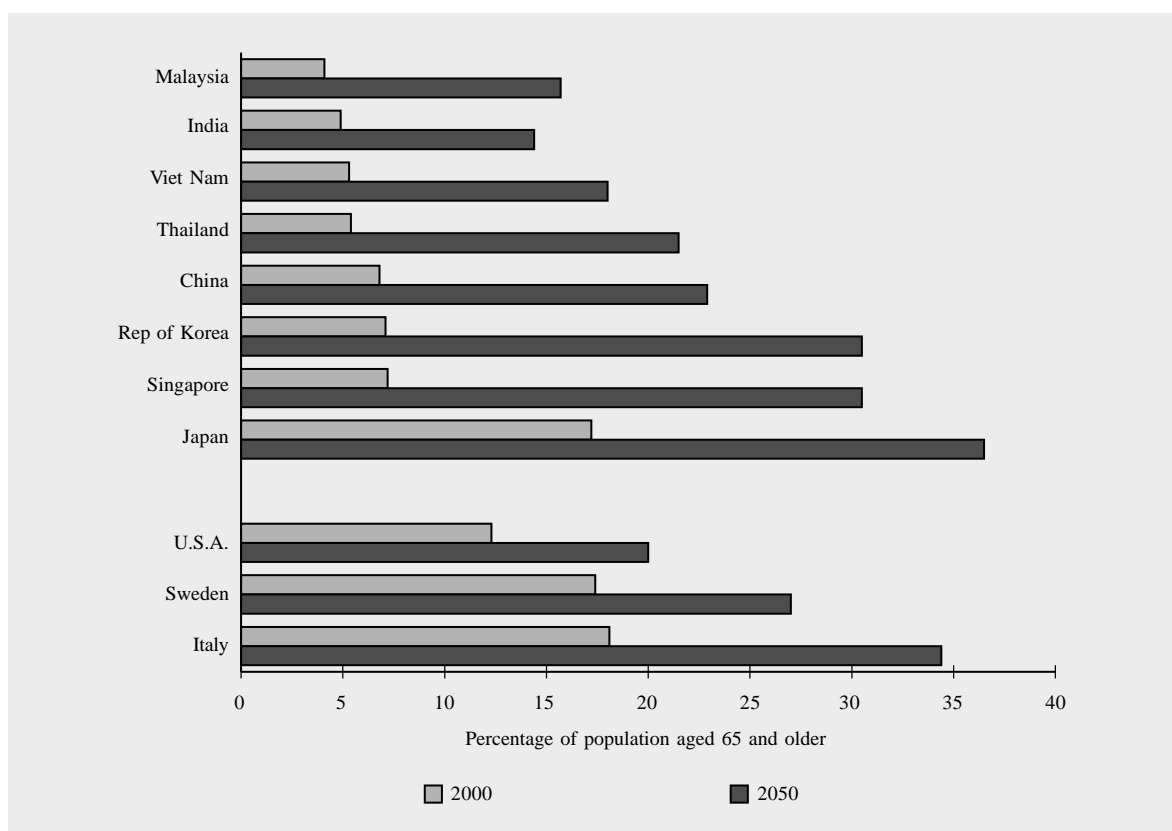
As people live longer, the demand grows for care related to conditions such as heart disease, cancer, vision impairment, osteoporosis and dementia. Population ageing will place an increasing burden on national health-care systems. Among the world’s economically developed countries, including Japan, health-care spending per capita is about four times higher for people aged 65 and older than

the rest of the population. Whatever the level of economic development, population ageing presents challenges in financing and delivering health-care services.

Although many Asian countries are just beginning to experience population ageing, the process is occurring much more rapidly than was the case in Europe or North America. At the same time, many Asian countries still face a high prevalence of childhood diseases and increasing prevalence of new and re-emerging infectious diseases including HIV/AIDS, drug-resistant tuberculosis and malaria. In addition, most Asian countries will have to meet the challenges of ageing at a much lower level of economic development than the West or the more developed Asian countries such as Japan (Westley and Mason, 2002).

VII. IMPLICATIONS FOR FUTURE RESEARCH

The current situation and future prospects of health and mortality conditions in Asia have some important implications for future research. Five areas of research are considered here.

Figure 10. Estimated percentage of population aged 65+ in selected countries of Asia and elsewhere, 2000 and 2050

Source: United Nations (2003). *World Population Prospects: The 2002 Revision, vol. II, Sex and Age Distribution of Populations* (United Nations publication, Sales No. E.03.XIII.7).

Table 7. Projected growth of Asia's older population

Region or subregion	Number of people aged 65 and older (thousands)			Percentage increase (2000-2050)
	2000	2025	2050	
Asia	215,947	474,519	879,630	407
East Asia	114,662	243,506	381,372	333
South-Central Asia	68,325	153,576	323,606	474
South-East Asia	24,411	57,393	126,047	516

Source: United Nations (2003). *World Population Prospects: The 2002 Revision, vol. II, Sex and Age Distribution of Populations* (United Nations publication, Sales No. E.03.XIII.7).

Note: The projected population is based on the medium variant. The following are included in the "eastern Asia" subregion: China; Hong Kong, China; Democratic People's Republic of Korea; Japan; Macau; Mongolia; Republic of Korea. The "south-central Asia" subregion: Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Kazakhstan, Kyrgyzstan, Maldives, Nepal, Pakistan, Sri Lanka, Tajikistan, Turkmenistan; Uzbekistan. The "south-eastern Asia" subregion: Brunei Darussalam, Cambodia, East Timor, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand; Viet Nam. The "western Asia" subregion: Armenia, Azerbaijan, Bahrain, Cyprus, Gaza Strip, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Turkey, United Arab Emirates; Yemen.

Rapid economic development and health risks: The effects of rapid economic development on lifestyle, environment, health and mortality demand more research attention. Although it is well understood that economic development in general improves health and reduces mortality, a few studies to date indicate that rapid economic development also leads to lifestyle and consumption patterns that are detrimental to health. Smoking, excessive drinking of alcohol, and dietary changes may result in increased risks of high blood pressure, obesity and high levels of cholesterol. Lifestyle changes that may be detrimental to health also include physical inactivity and unsafe sex. Furthermore, economic development is known to result in environmental changes such as air pollution, water contamination and exposure to carcinogens. Hence, it is important to understand the interrelationships among economic development, lifestyle changes, environmental factors and other risk factors linked to health and mortality.

Behavioural aspects of the HIV/AIDS epidemic: The future of the HIV/AIDS epidemic will depend on the behavioural aspects of a population, especially the interaction among sub-epidemic groups and the interaction between each of the sub-epidemic groups and the general population. Especially important are the sexual behaviour of adolescents and young adults and the precautions taken by female commercial sex workers.

New infectious diseases: More information is needed about new infectious diseases such as the severe acute respiratory syndrome (SARS) and avian influenza and the re-emerging infectious diseases such as drug-resistant tuberculosis and malaria. In addition, epidemiological studies need to include behaviour such as population movements and human-animal interactions.

Evaluation of health-care programmes: One of the urgent needs of health care is identifying effective health-care programmes that can be implemented and managed efficiently in countries undergoing sudden changes in this economic structure. Another need pertains to responding to the emerging risk factors of health and mortality related to lifestyle and consumption patterns. The eradication of many of the risk factors involves changing lifestyle and consumption patterns such as reducing smoking, changing dietary habits and increasing

physical activity. Using condoms at the time of uncommitted sexual intercourse is another behavioural change that can result in the reduction of health and mortality risks, although the understanding of how this can be achieved is limited.

Health care for older persons: As many countries in Asia are on the brink of experiencing rapid population ageing, providing adequate health-care services for older persons is becoming a priority national concern. The task is especially difficult in countries that are economically less developed and where the health-care burden tends to be focused on the provision of basic health care to different segments of the population. In this regard, research should include identifying the roles of the family and community, as well as local and central Governments, in providing adequate health care for older persons.

Much of the research agenda requires new approaches in data collection and analytical techniques. Collaboration among specialists in different disciplines across the medical sciences and social sciences will become increasingly important.

VIII. IMPLICATIONS FOR POLICIES AND PROGRAMMES

Health policies and programmes need to respond to persistent old health risks and new emerging health risks. In many Asian countries, the two types of challenge continue to coexist. Other important items for policy and programme considerations include dealing with the HIV/AIDS epidemic, responding to new and re-emerging infectious diseases, taking into account concerns for the environment and responding to the health-care needs of older persons.

Poverty: Many countries in Asia are too poor to provide basic health care, especially reproductive health care, to their populations. For these countries, national efforts need to be strengthened to improve the maternal health-care system, ensure adequate nutrition for pregnant lactating mothers and young children, and improve basic sanitary conditions. Hence, international cooperation and assistance can play important roles in this regard for very poor countries. Some countries undergoing sudden changes in their economic systems are also facing difficulties in providing basic health care

owing to the slow development of the new health-care systems that have come to replace the old ones and owing to widening income gaps. In these countries, improving the health-care system and providing basic health care to all citizens should be a national priority and integrated into national economic development plans.

Emerging risk factors of health and mortality: In order to minimize rapid emerging risks of health and mortality as a consequence of economic development and the mortality transition, it is very important that efforts be made to change consumption patterns of populations, so that people will adopt healthier lifestyles and prevent air pollution. Lowering the prevalence of smoking, promoting healthy diets, promoting physical activity and moderating consumption of non-renewable energy require both educational programmes and government policies and regulations. These efforts are particularly important in countries where economic development is occurring at a rapid pace.

HIV/AIDS: Surveillance of high-risk groups and promoting protective behaviour should be strengthened. As of now, political commitment to fight the HIV/AIDS epidemic tends to be weak in Asian countries owing to the relatively low levels of HIV/AIDS prevalence. Political leaders need to be aware of the emergence of a potentially serious epidemic and increase their commitment to combat this threat. In many countries, the public is not well informed about the nature of the HIV/AIDS epidemic. As such, it is important that full and accurate information be provided to the public. Positive attitudes towards people living with HIV/AIDS should also be promoted so that HIV/AIDS testing and treatment can be carried out efficiently. In

addition, eliminating poverty and improving the status of women will discourage women from becoming commercial sex workers and, in turn, acting as bridges between the HIV/AIDS sub-epidemics and the general population.

New infectious diseases: Health-care systems should always be prepared to deal with sudden epidemics of new infectious diseases and to deal with population movements when such epidemics occur. Health-care systems should be able to minimize the spread of such diseases through migration, travel and international trade. Programmes to minimize the animal-to-human transmission of disease-causing agents should also be developed and implemented.

Environment: Policies and regulations should be developed to ensure economic development that is friendly to the environment. Technological innovations to minimize the harmful effects of industrial activities causing air pollution and other harmful effects on the environment should be adopted at the early stages of a country's development.

Health care for older persons: Demographic trends, together with the economic conditions of older persons, should be monitored carefully so that countries will be prepared to provide the necessary health care for their growing older populations. The roles of the family and community, as well as local and central Governments, should be considered carefully; programmes at different levels should be coordinated effectively. In addition, the potentially beneficial role of healthy and able older persons in economic activities and health-care provision should also be taken into account.

References

- Academy of Preventive Medicine of Kazakhstan and Macro International Inc. (1999). *Kazakhstan Demographic and Health Survey 1999* (Calverton, Maryland, Academy of Preventive Medicine and Macro International Inc.)
- Banister, J. and K. Hill (2004). "Mortality in China 1964-2000", *Population Studies*, vol. 58, No. 1, pp. 55-75.
- BASICSII, the MOST Project and United States Agency for International Development (2004). "Nepal Child Survival Case Study: Technical Report", <<http://www.basics.org/publications/pubs/nepalcasestudy/Reports/TechReport.pdf>>.
- Brown, T. (2002). "HIV/AIDS in Asia", in *The Future of Population in Asia* (Honolulu, East-West Center), pp. 69-81
- Brown, Tim (2004). "Tackling the HIV/AIDS/AIDS epidemic in Asia", *Asia-Pacific Population & Policy*, No. 68.
- China Ministry of Health and United Nations Theme Group on HIV/AIDS/AIDS in China (2003). *A Joint Assessment of HIV/AIDS/AIDS Prevention, Treatment, and Care in China* (Beijing, Ministry of Health, National Center for AIDS/STD Prevention and Control, China CDC, and UNAIDS China Office).
- China State Statistical Bureau (2001). *Statistical Yearbook of China 2001* (Beijing, State Statistical Bureau).
- Choe, M.K., S. Thapa, C. Podhisita, C. Raymundo, H.-S. Lin and S. Achmad (2004). "The teen tobacco epidemic in Asia: Indonesia, Nepal, Philippines, Taiwan, and Thailand", *Journal of Youth Studies*, vol. 7, No. 1, pp. 73-87.
- Devasahayam, T.W. (2004). "A culture of cherishing children: Fertility trends of tertiary-education Malay women in Malaysia", Asia Research Institute Working Paper Series No. 23, Asia Research Institute, National University of Singapore.
- Du, S., T.A. Mroz, F. Zhai, B.M. Popkin (2004). "Rapid income growth adversely affects diet quality in China – particularly for the poor!", *Social Science and Medicine*, 59, pp. 1505-1515.
- Energy Information Administration (2004). *International Energy Outlook 2004*, <<http://www.eia.doe.gov/emeu/international/enviro.html#IntlCarbon>>.
- ESCAP (2003). *Asia-Pacific in Figures 2002* (ST/ESCAP/2228).
- Gao, J., J. Qian, S. Tang, B. Erikson and E. Blas (2002). "Health equity in transition from planned to market economy in China", *Health Policy and Planning* 17(Suppl. 1), pp. 20-29.
- Goldman, N. (1980). "Far Eastern patterns of mortality", *Population Studies*, vol. 34, No. 1, pp. 5-19.
- (2003). "A reply to 'On the Far Eastern pattern of mortality' by Zhongwei Zhao", *Population Studies*, vol. 57, No. 3, pp. 367-370.
- He, T., X. Wang and F. Liu (2004). "Income inequality in China" (China National Institute of Law, Chinese Academy of Social Sciences, <<http://www.iolaw.org.cn>>, accessed on 12 August 2004.
- International Institute for Population Studies (IIPS) (1995). *National Family Health Survey (MCH and Family Planning), India 1992-93* (Mumbai, IIPS).
- and ORC Macro (2000). *National Family Health Survey (NFHS-2), 1998-99: India* (Mumbai, IIPS).
- International Medical Foundation of Japan (1997). *Recent Trends in Health Statistics in South-east Asia 1974-1993* (Tokyo, Southeast Asian Medical Information Center, International Medical Foundation of Japan).

- International Monetary Fund (IMF), Organisation for Economic Cooperation and Development (OECD), United Nations and the World Bank Group (WBG) (2000). *A Better World for All: Progress towards the International Development Goals* (IMF, OECD, United Nations and WBG).
- Khanal, P. (2002). "Nepal's childhood mortality falls by half as vaccinations rise tenfold", *Bulletin of the World Health Organization*, vol. 80, No. 12, pp. 988-989.
- Mishra, V. (2002). "Population and environmental challenges in Asia", *Asia-Pacific Population & Policy* No. 63, Honolulu, East-West Center.
- Monitoring the AIDS Pandemic Network (2004). *AIDS in Asia: Face the Facts*, <http://www.mapnetwork.org/reports.aids_in_asia.html>.
- Myanmar Department of Population (1998). *Myanmar Fertility and Reproductive Health Survey 1997* (Yangon, Myanmar, Department of Population, Ministry of Immigration and Population).
- Nanjo, Z. and K. Kobayashi (1985). *Cohort Life Tables Based on Annual Life Tables for the Japanese Nationals Covering the Years 1891-1982*, NUPRI Research Paper Series No. 23 (Tokyo, Nihon University Population and Research Institute).
- Popkin, B.M. (2002). "The shift in stages of the nutrition transition in the developing world differs from past experience!", *Public Health Nutrition*, vol. 5, No. 1A, pp. 205-214.
- Riley, N. E (2004). *China's Population: New Trends and Challenge* (Washington DC, Population Reference Bureau).
- United Nations (2004a). *World Population Prospects: The 2002 Revision Population Database*, <<http://esa.un.org/unpp>>, accessed on 24 July 2004.
- United Nations (2004b). *World Fertility Report: 2003* (United Nations publication, Sales No. ESA/P/WP.189).
- UN Standing Committee on Nutrition (2004). *Fifth Report on the World Nutrition Situation* (Geneva, SCN).
- Westley, Sidney and A. Mason (2002). "Asia's Aging Population", in *The Future of Population in Asia* (Honolulu, East-West Center), pp. 83-95.
- World Bank Group (2004). *World Development Indicators 2004* (Washington DC, World Bank Group).
- World Health Organization (2002). *The World Health Report 2002 – Reducing Risks, Promoting Healthy Life* (Geneva, WHO).
- _____ (2003). *The World Health Report 2003 – Shaping the Future* (Geneva, WHO).
- _____ (2004). *The World Health Report 2004 – Changing History* (Geneva, WHO).
- Zhang, K.-L. S. Ma and D. Xia (2004). "Epidemiology of HIV/AIDS and sexually transmitted infections in China", *Sexual Health*, 16, pp. 39-46.

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Chapter III

Morbidity and Mortality Patterns in the Pacific

*Christine McMurray**

The 22 countries and territories of the Pacific Community sprawl across a vast area of ocean that occupies one third of the earth's surface but encompasses only about 0.04 per cent of its total land area. They are peopled by barely 0.0014 per cent of the earth's total population, less than 9 million people in total. Although they are often bundled together because of their small population size, Pacific island countries and territories are extremely diverse, exhibiting a wide range of population and health characteristics. Even in the Pacific subregion, Melanesia, Micronesia and Polynesia are characterized by many contrasts. This diversity is reflected in health and survival patterns. Some are close to those of industrialized countries, while in others the health and survival patterns are very definitely those of less developed countries. Since 85 per cent of the Pacific's total population live in Melanesia, and 65 per cent in a single country, Papua New Guinea, subregional statistics not only conceal diversity but also are inevitably biased towards the larger countries, which tend to have the lowest health standards. It is crucial to remember this diversity when considering key issues and intervention priorities in the Pacific.

This paper begins with an analysis of the nature of the health transition occurring in the Pacific, and a review of the underlying population and development interactions that influence health in the Pacific. It then looks in more detail at patterns of mortality and morbidity, and considers some specific issues in health and health-service delivery. The role of the Millennium Development Goals (MDGs) in monitoring progress in health in

Pacific island developing countries and territories is also reviewed. The paper concludes by briefly considering likely future trends in Pacific mortality and morbidity.

I. PATTERNS OF HEALTH TRANSITION IN THE PACIFIC

Among the greatest benefits of modernization has been the transition from a state of relatively high mortality from infectious diseases to a state where most infectious diseases are controlled and the main cause of death is non-communicable diseases occurring in old age. This change, usually known as the epidemiological transition or the health transition (Frank and others, 1989), occurs largely because of improved sanitation and hygiene, immunization, antibiotics and surgical advances. Whereas this process took more than 100 years in European countries, while the causes of ill-health were being discovered and tackled one by one, it occurred with astonishing rapidity in some countries in the second half of the last century, when health knowledge and technology could be imported from other countries. For example, life expectancy at birth in China was 47 years in 1960 but had risen to 70 years by 1988 (Diamond and McDonald, 1994, p. 32).

In the original health transition model, the reduction in mortality from infectious diseases is accompanied by a corresponding increase in non-communicable diseases. That is, instead of succumbing to infectious diseases at younger ages, people tend to die at older ages from non-communicable diseases such as coronary malfunctions and cancer. In post-health-transition societies, most people who reach 70 years of age or more die from

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a non-communicable disease as a consequence of the seemingly inevitable “wearing out” of their biological systems. There is a general improvement in health and life expectancy, and the main cause of mortality shifts from infectious diseases to non-communicable diseases.

The past few decades have seen the appearance of a different variant of the health transition model in the Pacific. Although there have still been some reductions in infectious diseases and increases in life expectancy, the overall improvement in the health of populations is less dramatic than that experienced by industrialized countries during the twentieth century. The prevalence of non-communicable diseases among adults of increasingly younger ages is so extensive that some have described it as a “second wave” of disease (SPC, 2000a, p. 6). The most common early-onset non-communicable diseases in the Pacific are diabetes mellitus, coronary and vascular diseases and obesity, all conditions related to lifestyle.

The advanced stages of most non-communicable diseases, including obesity, renal failure and cerebrovascular diseases, often bring a period of disability that may last for some years before the sufferer eventually succumbs to the condition. This burden of disease has caused an increase in disability-adjusted life years¹ as a proportion of the total years lived (WHO, 2002). This has important consequences for the allocation of health resources since most Pacific island countries refer patients requiring advanced treatments to overseas hospitals, which is very costly for them. More non-communicable disease-induced disability means that less resources are available for basic medical services and primary health care. This will be discussed in more detail below.

The dramatic increase in non-communicable diseases in the Pacific has not been paralleled by a comparable reduction in infectious diseases, as presumed by the health transition model. Malaria is still endemic in Papua New Guinea, Solomon Islands and parts of Vanuatu, and outbreaks of den-

gue fever occur throughout Melanesia and sometimes also in Polynesia. Throughout the Pacific subregion, tuberculosis, lymphatic filariasis and yaws are not yet controlled, and there are frequent outbreaks of serious respiratory diseases. Diarrhoeal diseases related to poor sanitation and hygiene are common, with cholera and typhoid outbreaks occurring occasionally. Hepatitis B is endemic in some countries, with the carrier rate being as high as 31 per cent in Kiribati. In addition, relatively small but steadily increasing numbers of HIV-positive cases and AIDS death have raised concerns about the possibility of a major epidemic in the Pacific (see country reports in WHO, 2004).

II. POPULATION, ECONOMIC DEVELOPMENT AND HEALTH

The underlying causes of the Pacific pattern of health transition can be found in population and economic development patterns and linkages and their impact on national capacity to provide healthy lifestyles and adequate health care. To fully understand these relationships, it is necessary to consider the last two centuries of Pacific history.

Most of the Pacific was colonized during the nineteenth and twentieth centuries because the area had considerable strategic and economic value, while at the same time the small island populations offered little resistance to colonization. The colonial powers established bureaucracies to facilitate administration and the export of raw materials, but in most countries there was only minimal development of local industry.

The health implications of early contact were dramatic. Melanesian populations have always been exposed to a range of infectious tropical diseases, whereas other areas, especially Polynesia, had few infectious diseases prior to contact with foreign nations. The 1800s brought major epidemics of common infectious diseases, such as measles and influenza, which were rarely fatal among European populations. As the islanders had no natural resistance to these diseases, mortality soared and populations were decimated (McArthur, 1967). The Second World War also contributed to high mortality rates among islanders when the Pacific was occupied by Japanese forces and, subsequently, became a major theatre for battles between the allied forces and Japan.

¹ The term “disability-adjusted life years”, or DALYs, refers to the number of years out of an expected lifespan that are affected by disability, that is, time spent in ill health. It is usually used to measure the burden of disease at the population level.

By the time peace returned in the post-war period, most Pacific islanders had developed a reasonable level of immunity to common infectious diseases. This, combined with the effect of political stability, improved water and sanitation services in urban areas and the establishment of modern health services, produced dramatic reductions in mortality. Since the total fertility rate in most Pacific island countries at that time was at least 5-6 children per woman, and up to 8 in some, this resulted in a period of rapid population increase.

By the 1960s, the colonial period was in decline, and by the 1990s most Pacific island countries had attained independence. The new countries soon found that their average population growth rate was tending to outstrip their average economic growth rate. At the same time, modernization fostered an ever-increasing demand for cash to purchase imported goods, while the lack of local industrial development meant fewer wage-paying job opportunities outside the already bloated public sector. As Pacific island countries lack indigenous capital, technical expertise and skills, the richest resources, including minerals, forests and oceanic fisheries, are exploited by overseas companies, while the owners receive only a small fraction of the total value. Apart from copra, Fiji's sugar industry and agricultural surpluses from family enterprises, most commercial agriculture is owned and operated by overseas interests. The only country that derived great riches from its natural reserves of phosphate, Nauru, was severely lacking in financial management skills at both the national and household levels, so virtually all of the wealth was frittered away.

Fertility rates are currently declining in most Pacific island countries and some are supplementing their economies by exporting labour, but there is still a tendency towards substantial rates of natural population increase and slow-growing or stagnating economies. Some of those with the least favourable balance between population growth and economic growth, or an especially inequitable distribution of resources, have experienced political instability that tends to add to their economic problems. These include Fiji, Papua New Guinea, Solomon Islands and Vanuatu. Virtually all countries in the Pacific subregion receive substantial amounts of development assistance or direct support from a metropolitan "mother country", and are especially reliant on such assistance to augment health services.

Table 1 depicts population size, average annual growth rate, gross national income per capita and percentage of the population that is urban for 21 of the 22 Pacific Community members.² It can be seen that eight had intercensal population growth rates of 2 per cent or higher, sufficient to double their populations in 35 years or less. If the Solomon Islands and Papua New Guinea growth rates of 2.8 and 2.7 per cent are sustained, the population of these countries would double in only 25 and 26 years respectively.

The exceptionally high growth rates of Northern Mariana Islands and Palau are largely a consequence of inflows of labour to their light manufacturing and tourist industries. Both have adequate per capita incomes, easy access to good quality health services and relatively good standards of living. The remaining countries with high population growth rates, however, all have comparatively low per capita incomes, limited health services and lower standards of living.

Rapid population growth coupled with urbanization, stagnating economic development and political instability rates are associated with new health risk factors. The principal cause is the shift from traditional to modern diets and lifestyles. Traditional Pacific lifestyles are based on hunting and gathering and subsistence cultivation. Although food supplies are variable and there tends to be not much variety, the traditional diet is relatively wholesome and the effort expended in food production keeps most people in reasonable shape. The advent of the cash economy promoted the consumption of cheap imported foods and reduced reliance on subsistence. In most of the Pacific, including rural areas, polished white rice, white bread and noodles have become staple food items. Other popular foods are canned meat and fish, biscuits and sugar products, while frying in oil has become the principal method of cooking.

The typical traditional diet is moderate to high in energy, moderate to low in fat, moderate to low in protein, high in complex carbohydrates and fibre, low in simple carbohydrates, high in antioxidants, potassium and trace minerals, and low in salt. In contrast, the modern diet is almost the opposite:

² Pitcairn Islands, a British territory with a population of only 47 people in total, is not considered in this paper.

Table 1. Population and development characteristics of 21 Pacific Community members

	<i>Population (2004 estimate)</i>	<i>Intercensal growth rate (% per annum)</i>	<i>GNI per capita (US dollars) (2001)</i>	<i>Urban (%)</i>	<i>Safe water (%)</i>	<i>Adequate sanitation (%)</i>
Melanesia						
Fiji Islands	891,100	1.6	2,150	46	47	43
New Caledonia	291,600	2.1	14,720	71	100	90
Papua New Guinea	7,236,200	2.7	580	13	41	83
Solomon Islands	589,700	2.8	590	16	71	34
Vanuatu	289,400	2.6	1,050	21	88	100
Micronesia						
Micronesia, Federated States of	129,000	0.3	2,150	21	41	45
Guam	193,800	1.5	18,760	93	100	100
Kiribati	119,700	1.7	830	43	47	48
Marshall Islands	66,100	2.0	2,190	65	88	81
Nauru	11,300	0.3	n.a.	100	n.a.	n.a.
Northern Mariana Islands	109,300	3.3	9,190	90	100	90
Palau	25,900	2.0	7,645	81	79	100
Polynesia						
American Samoa	78,000	2.0		66	100	98
Cook Islands	12,100	0.6	4,270	68	100	100
French Polynesia	307,200	1.6	16,765	52	100	98
Niue	1,200	-1.7	4,930	34	100	100
Samoa	201,900	0.7	1,490	22	99	99
Tokelau	1,500	0.0	1,800	0	48	48
Tonga	95,400	0.4	1,530	32	97	94
Tuvalu	10,000	0.4	1,260	47	100	100
Wallis and Futuna	15,700	0.9	n.a.	–	100	80

Source: Population, growth rates and percentage of urban population: SPC Demography/Population Programme web site: <<http://www.spc.int/demog/>> and Secretariat of the Pacific Community (2000). *Oceania Population 2000* (wall poster) (Noumea: Demography/Population Programme, Secretariat of the Pacific Community). GNI/pc (gross national income per capita): Asian Development Bank web site: <http://www.adb.org/documents/books/key_indicators/2003/> and Secretariat of the Pacific Community (2002). SPSS (South Pacific Economic and Social Statistics), data accessed from web site on 2 August 2003, <<http://www.spc.int/stats/>>. Water and sanitation: World Health Organization (2004). "Western Pacific Regional Health Database, 2002 Revision", data accessed from web site on 17 August 2004, <<http://www.wpro.who.int/chips/chip02/>>.

high in energy, fat and protein; low in complex carbohydrates and fibre, high in simple carbohydrates; low in antioxidants, potassium and trace minerals, but high in salt (SPC, 2000a, p. 13). This diet contributes to high rates of overweight in adults and, increasingly, in children. The extent to which modern foods have replaced traditional subsistence is greater in urban than in rural areas, and directly related to involvement in the cash economy.

Dietary change has been accompanied by the introduction of commercially brewed alcohol and manufactured cigarettes, which has led to an increase in cigarette smoking, among both men and women, and in alcohol consumption, especially

among men. Reduced emphasis on subsistence agriculture has resulted in a general decline in physical activity and the adoption of a sedentary lifestyle, especially for women, who are expected to move slowly and with dignity, and so have a greater tendency to become obese. On the other hand, young children have an increased risk of stunting because of limited consumption of protein.

Environmental health also has tended to deteriorate where infrastructural development has not kept pace with population growth. Increasing population densities in locations where there is inadequate access to piped water or sanitation have contaminated previously healthy environments.

Whereas it might be relatively safe for a small village to use the ocean or lagoon for defecation, when almost 30 per cent of a concentrated population of 40,000 does so, as in South Tarawa in Kiribati (Republic of Kiribati, 2002), serious contamination can occur.

The evolution of these new lifestyle-related risk factors has contributed to a dramatic increase in non-communicable diseases. Paradoxically, in the Pacific, greater purchasing power tends to be associated with greater vulnerability to non-communicable diseases rather than with better health. The negative impact of modern urban lifestyles on health is clearly evident in that the incidence of early onset of non-communicable diseases tends to be lower in the outer islands and remote areas where traditional foods are consumed and people engage in subsistence agriculture and food gathering (Coyne, 2001, p. 13). Those living outside urban areas, however, have inferior access to health services. The extent to which these two factors offset each other varies from country to country and depends on living standards and the level of development of the health infrastructure.

In Papua New Guinea, for example, rural health services are very basic and often inaccessible to many people living in remote and isolated villages, while non-communicable diseases are only just becoming a concern in urban areas. Health in urban areas therefore tends to be better than in rural areas. In contrast, in Marshall Islands, where infectious diseases are not endemic, but lifestyle-related diseases are a major concern in urban areas, the reverse is true. Although health services are generally rudimentary in outer atolls in Marshall Islands, most people can access them and can be evacuated to urban health facilities if necessary, while most children are immunized. As a consequence, health is generally better outside urban areas where people consume traditional diets and practise traditional lifestyles. This is even truer of Samoa and Tonga, where most people have access to adequate health services and living conditions are generally better, and the major negative impacts on health are lifestyle factors associated with urban living.

The increase in lifestyle-related health risk factors has slowed the rate of increase in adult life expectancy in most Pacific island countries and territories, while infant mortality rates also have tended to stagnate. Table 2 shows the key demo-

graphic indicators of total fertility rate, infant mortality rate and average life expectancy.³ It should be noted that a difference of one or two births a year in very small populations can produce a substantial impact on fertility and infant mortality. There is also the problem that birth and death registration is incomplete in most Pacific island countries, and infants who die are unlikely to be reported.

Substantial variation between countries and territories in both infant mortality and life expectancy is evident in table 2. American Samoa, Guam, French Polynesia, New Caledonia, Northern Mariana Islands, and Wallis and Futuna have all reached levels of infant mortality below 10 deaths per 1,000 live births. Cook Islands, Fiji, Palau, Samoa and Tonga are not far behind, ranging to over 20 deaths per 1,000 live births. At the other extreme, Papua New Guinea and Solomon Islands have infant mortality rates above 60. In fact, the figures for Vanuatu and Solomon Islands are questionable. The figure for Vanuatu, derived directly from census data, almost certainly understates infant mortality, while that for Solomon Islands is adjusted from census data and may be too high. It is likely that both are actually around 40-50 per 1,000, as conditions in these countries are better than those in Papua New Guinea but not as good as those in smaller countries. Interestingly, there is no strong correlation between fertility and infant mortality, largely because of substantial variation in access to health services. Particularly in the larger Melanesian countries, some women in remote areas give birth without any form of assistance, resulting in significant rates of maternal as well as infant mortality.

Table 2 also shows substantial variations in life expectancy. The lowest life expectancies are in Nauru and Papua New Guinea, but in the case of Nauru, a lower life expectancy is mainly because of the early onset of non-communicable diseases, whereas Papua New Guinea has barely commenced its health transition and infectious diseases are still widespread. Polynesia tends to have the longest life expectancies, along with the wealthy territories of France and the United States of America. Nonetheless, only 6 of the 21 Pacific Community members have reached a life expectancy of 70 years or more

³ The rates in table 2 are derived from the SPC database and refer to the latest census and registration data, so they may differ from those of the WHO Western Pacific Region Health Database.

Table 2. Fertility, infant mortality and life expectancy in 21 Pacific Community members

Country/territory	TFR ^a	Infant mortality rate ^b	Life expectancy at birth(years)		Reference period ^c
			Males	Females	
Melanesia					
Fiji	2.7	22	65	69	2000
New Caledonia	2.4	7	70	78	2002
Papua New Guinea	4.6	64	54	55	2000
Solomon Islands	4.8	66	61	62	1997-1999
Vanuatu	4.8	27	66	69	1999
Micronesia					
Micronesia, Federated States of	4.1	40	67	68	2000
Guam	2.9	9	75	81	2001-2003
Kiribati	4.3	44	61	67	2000
Marshall Islands	5.7	37	66	69	1999
Nauru	4.0	42	53	58	1997-2002
Northern Mariana Islands	1.6	5	73	78	2000
Palau	2.5	17	66	72	2000
Polynesia					
American Samoa	4.0	9	69	76	2000-2002
Cook Islands	2.9	21	68	74	1996-2002
French Polynesia	2.4	7	69	74	1998-2002
Niue	3.0	29	69	71	1997-2001
Samoa	4.6	19	72	74	2001
Tokelau	4.9	33	68	71	1997-2000
Tonga	3.8	12	70	72	1995-2001
Tuvalu	3.7	35	62	65	1997-2002
Wallis and Futuna	3.0	7	70	74	2000-2003

Source: Secretariat of the Pacific Community web site, <<http://www.spc.int/demog>>.

^a Total fertility rate (children per woman).

^b Per 1,000 live births.

^c Estimates are derived from the latest census or from recent registration data.

for men, and only two members have reached the upper 70s for women. These patterns are considered in more detail below.

III. PATTERNS OF MORBIDITY AND MORTALITY

An examination of the five leading causes of morbidity and mortality for each country recorded in the WHO Western Pacific Regional Database in August 2002 <<http://www.wpro.who.int/chips/chip02>> shows substantial variation both between and within the three groupings. It is particularly interesting that the information in the database says as much about the quality and pattern of health services in the Pacific as about health status.

With regard to the quality of reporting, it is noticeable that the three French territories (French Polynesia, New Caledonia, and Wallis and Futuna) have incomplete data. Since they are technically part of France, their health data are coordinated by France rather than locally. While health standards in urban French Polynesia and New Caledonia are comparable with European standards, the indigenous populations in rural areas are not as well served. In the case of Wallis and Futuna, a small island economy that does not have a large European-French population or high-level medical facilities, lack of data to compare with other Pacific countries carries the risk that some important health issues could be overlooked.

Aside from the French territories, it is clear that the quality of health information reported and the interpretation of classifications are very variable. Although in theory all countries adhere to the *International Statistical Classification of Diseases and Related Health Problems* (ICD-10) classifications, some phrases that are used to describe conditions are not consistent with the ICD-10 standard. Frequent vague diagnoses such as “bodyache” (the leading cause of morbidity in Tuvalu), “symptoms, signs and ill-defined conditions” (the leading cause of mortality in Kiribati, the third leading cause in Tonga and the fifth leading cause in New Caledonia) and “unknown and other” (the second leading cause of mortality in Palau) are a consequence of inadequate laboratory facilities and diagnostic capacity, shortages of skilled health personnel and the high proportion of deaths unattended by a medical practitioner.

The consequences of inadequate diagnosis can be very serious. One example is that of a Nauruan infant that displayed symptoms of major problems from the time it was delivered. The condition was diagnosed as “FTT” – failure to thrive. When the baby did not improve, a further diagnosis of Down’s syndrome was made a few weeks later. As the mother was only 24 years old, she asked what tests had formed the basis of this diagnosis and was informed that testing facilities were not available and the diagnosis had been made on the basis of the medical practitioner’s experience. She was unable to obtain a second opinion, as hospital patients in Nauru are permitted to consult only one doctor. After six months of no improvement, a further diagnosis was made, that is, macrocephaly caused by a faulty heart valve impairing circulation of blood to the head. By this time, the baby was suffering a number of additional complications. Although the heart valve was repaired in Australia, the child later died at age 14 months (personal communication, April 2004).

The WHO Western Pacific Regional Database also shows enormous variations in rates of morbidity. Although almost all are said to be rates per 100,000, it seems improbable that Kiribati has more than seven times the Vanuatu rate of acute respiratory infections. The data also appear to be affected by the accessibility of health services. For example, very low reported rates of intestinal and infectious diseases in Papua New Guinea almost

certainly reflect low rates of treatment and recording rather than low incidence. Such inconsistencies between countries carry the risk that simple comparisons of rates, without understanding or taking into account the nature of health systems in each country, could be misleading and could contribute to unrealistic prioritization by donors.

Incomplete reporting is also much in evidence in the WHO Western Pacific Regional Database, suggesting limited data management capacity at the country level. For example, Solomon Islands reported only three leading causes of morbidity and mortality, rather than 10 as provided for in the database. Reporting by some countries of rates in excess of 100 per cent (e.g., for acute respiratory infections in Kiribati) suggest confusion between rates per 100,000 and the number of visits. Tokelau has no health statistician, so Tokelau’s leading causes of morbidity are reported in terms of number of visits per 1,000 population rather than per 100,000, as required by the database, and Tokelau’s leading causes of death are reported as percentages rather than as rates per 100,000.

Limited or lack of statistical capacity limits the ability to plan and monitor health services, especially services in remote areas that usually have the least capacity to report because of small numbers of personnel. An example of the effect of lack of monitoring capacity in Solomon Islands is that medical supplies are commonly distributed on the basis of the central health department’s estimate of what is likely to be needed by each facility, rather than in response to facility-level inventories and order forms (personal communications, November 2003 and July 2004).

With regard to the actual patterns in the WHO Western Pacific Regional Database, in the majority of Pacific island developing countries and territories both infectious and non-infectious diseases appear among the five leading causes of morbidity and mortality. Overall, infectious diseases account for about half of the reported leading causes of morbidity, and around 15 per cent of the reported leading causes of mortality (excluding the category “Diseases of the respiratory system”, which may or may not be infectious). This seems surprising, since modern medical technology and high levels of donor assistance in the Pacific should be sufficient to ensure that infectious diseases do

not appear among the five leading causes of either morbidity or mortality in any of the 21 countries. The fact that they continue to be so important is indicative of limited capacity in health systems and lack of universal access to health facilities. This persistence of infectious disease in the Pacific also helps to explain the stagnation in mortality improvement discussed above.

Kiribati and Solomon Islands provide good illustrations of the consequences of inadequate access to health services. Kiribati comprises a single high island and 32 atolls sprinkled across approximately 3.5 million square km of ocean, with 93 per cent of the total population living in the Gilbert group to the west. The only hospital offering even basic-level surgery or specialist services of any kind is located in semi-urban South Tarawa, where 40 per cent of the total population reside (Republic of Kiribati, 2002). Most residents on outlying islands and atolls are served by only very basic aid post facilities. Those who need more advanced treatment must travel to South Tarawa, which can be reached only by infrequent domestic air services (seldom more than once or twice weekly) that are unaffordable for most of the population, or by hazardous voyages in small boats across open waters. Unsurprisingly, severe illness or major injury is almost always fatal in Kiribati. Even the hospital in South Tarawa has only very limited capacity to deal with severe trauma, and some of the equipment is not always in good working order (personal communication, 2004). Similar problems can be found in other atoll societies, including Marshall Islands and Tuvalu.

Much of Solomon Islands suffers from similar access problems to those of Kiribati, while patterns of health coverage that may appear to be adequate on paper are not necessarily so. In Solomon Islands the minimum catchment for a health facility is 1,500 people (personal communication, Director of Reproductive and Child Health, 2004). While this is reasonable in coastal areas where population densities are highest, it may mean that facilities are effectively inaccessible to communities in mountainous inland areas. When people have to walk for a day or more in difficult terrain to reach even a minimal health facility, births are unlikely to be attended, children are unlikely to be immunized and people in need of medical attention

may not receive it until it is too late to prevent death. Problems of this nature can be found in isolated mountainous communities throughout the larger Melanesian countries, including Papua New Guinea, Vanuatu and some parts of Fiji.

Prioritization and allocation of health funding is another major issue in Pacific health systems. Since it is impractical to provide comprehensive high-level facilities in small countries, most rely to some extent on referrals and evacuations, including the most technically advanced territories of French Polynesia and New Caledonia. While referrals may be affordable for these wealthy territories, they can absorb an unreasonable percentage of the health budget in smaller countries and territories. An example of health inequities resulting from the high cost of referrals is the case of Nauru.

In 2003, 10 per cent of the total annual Nauruan health budget was spent on 30 or so patients who were receiving regular dialysis, while another 36 per cent was spent on overseas referrals for around 170 patients. All of the dialysis patients and a high proportion of those referred overseas were suffering from diabetes or other non-communicable diseases. After allowing for these expensive treatments and other fixed costs, only 42 per cent of the total budget remained to provide services for the bulk of the population (AusAID and Nauru Department of Health, 2003, p. 8). While the cost of treating each dialysis patient is around US\$ 24,000 per year and each overseas referral costs an average of US\$ 19,650, the amount available for the rest of the population, for both curative and preventive services, averages only around US\$ 300 per person (figure estimated from AusAID and Nauru Department of Health, 2003; and Nauru Bureau of Statistics, 2002). Although it may seem heartless, it is not difficult to understand a view expressed to the author by several Nauruans that palliative care is a luxury Nauru cannot afford, and terminally ill people should not receive any medical treatment.⁴

⁴ Although it had one of the world's highest per capita incomes during the 1980s, Nauru did not set aside sufficient funds to ensure its economic viability when the phosphate resources would be exhausted. At the time of writing, Nauru was having extreme difficulty meeting the cost of maintaining basic services, including health, education, water, sanitation and energy generation.

IV. OTHER ISSUES IN HEALTH AND HEALTH CARE

A. Maternal and child health

Provision of adequate maternal and child health (MCH) services has been prioritized by virtually all Governments in the Pacific and by donors working in the subregion. Despite this, access to and the quality of MCH coverage varies throughout the subregion. For example, although the percentage of deliveries supervised by trained personnel is around 85 per cent or higher in most of the Pacific, it is as low as 45 per cent in Papua New Guinea. This is reflected in the maternal mortality ratio of 370 deaths per 100,000 live births in Papua New Guinea, compared with ratios below 100 per 100,000 live births in most other Pacific countries (WHO, 2004).

Major global child health initiatives, including the Expanded Programme of Immunization (EPI) and oral rehydration therapy, have been widely adopted in the Pacific and strongly supported by donors. Originally, six major diseases were included in EPI in the Pacific (tuberculosis, measles, polio, diphtheria, tetanus and pertussis). During the 1990s, overly zealous adherence to this international standard meant that some countries neglected to immunize children against other infectious diseases that were prevalent locally. In Papua New Guinea, for example, doctors reported difficulties in persuading local authorities to add Hib vaccine to the list, even though haemophilus influenza B is a major cause of infant death (personal communication, Goroka Hospital medical staff, 1998). Generally, such problems have now been overcome, and most countries have reviewed and customized their EPI programme and included other vaccines such as hepatitis B as appropriate.

Two ongoing concerns in MCH are access to services and maintenance of the cold chain for vaccines. Although urban and heavily populated areas are usually well served, it is logistically difficult and costly to provide services to scattered villages in the remote mountainous areas and isolated islands that are common in the Pacific. A mid-2004 example from Choiseul Province in Solomon Islands illustrates the problems typically experienced in remote areas.

Taro Hospital, the major facility for Choiseul Province, is located on a small island. It serves a number of isolated villages on other islands that can be reached only by small boat. In previous years, Taro Hospital serviced "satellite" clinics in outlying villages two or three times a week, but clinics have become infrequent since national-level political instability brought intermittent fuel shortages that immobilized the hospital boat. In mid-2004, timely MCH services were generally available only to those mothers who could access a private boat. This has reduced immunization coverage and also means that some mothers may not be attended at delivery.

At the same time, Taro Hospital has experienced difficulties in maintaining the cold chain for vaccines because it lacks a continuous electricity supply and there have been shortages of kerosene to keep the kerosene refrigerator running. Since communications are poor, there have been occasions when mothers with infants from outlying villages have paid the cost of boat travel to Taro Hospital only to find that no vaccines were available at that time. In very small countries, such as Tuvalu, "it only takes one refrigerator to be out of service and the coverage rate drops by 15 to 20 per cent" <<http://www.pro.who.int/chips/chip02/tuv.htm>>.

Even where access to MCH services is good, they are not necessarily fully utilized. For example, antenatal care and infant health services are readily accessible on the tiny island of Nauru, but immunization coverage was only around 80 per cent in 2004 (Nauru MCH clinic statistics, April 2004). This was largely because of a decline in health promotion activities and reduced capacity of the MCH unit to visit individual households. These factors, along with declining living standards and deteriorating environmental conditions, have produced a more-than-threefold increase in infant mortality in Nauru as compared with the early 1990s.

B. Public health and primary health care

Pacific countries readily embraced the concepts of public health measures and primary health care. Even so, they have tended to be under-resourced and less effectively implemented than curative medical services. In much of the Pacific, water and sanitation infrastructure date from colonial times or were funded by external donors that assumed that after the initial construction, recipient countries would take responsibility for maintaining

and extending the facilities as necessary. Small island countries, however, tend to lack the resources and expertise to maintain such facilities, or simply have other priorities because of limited budgets (SPC, 2001). In recent decades, more attention has been given to sustainability, but new solutions still tend to be perceived as “alternative” or “appropriate technology” because they differ from the global standard. In the Pacific, it is becoming more common to use the roofs of houses for water catchment, but uptake of even this simple and obvious technology has been slow because storage tanks, metal roofs and gutters are expensive, and the costs are usually borne by individual household owners rather than by municipal authorities.

In 1992, a doctor working in Port Moresby Public Hospital, Papua New Guinea, remarked to the author that until the local city council makes the water supply safe and reliable, his efforts to treat children with diarrhoea would be nothing more than a “band-aid” solution to the problem. Although there have since been major upgrades to Port Moresby’s water and sewerage services (Inter Financial, 1999), access to safe water in rural areas is still estimated at only 41 per cent (see table 1). In the absence of clean water to wash hands, some of the facilities classified as “safe sanitation”, such as pit latrines, do little to reduce the risk of diarrhoeal disease.

Since the evolution of Western curative health care played a pivotal role in the health transition in industrialized countries, it was widely assumed by colonial powers that this was the best model of health care for the small island societies of the Pacific. Hence, curative medicine was widely adopted as the universal standard during colonial times. When primary health care was introduced during the 1980s, there was an already sharp division of preventive and curative services, especially in the countries receiving most of their assistance from the United States. This rigid separation of function led to inefficiencies in the provision of health care, especially since trained personnel tended to be in short supply. Opportunities to provide advice on nutrition or disease prevention or counselling in family planning for high-parity mothers were often lost because they were not perceived as part of the responsibility of those employed to provide curative services (McMurray and Smith, 2001). While this separation has become less rigid

in recent years, countries still face the problem of how to share scarce resources between potentially high-cost, but necessary, curative services and low-cost, but vastly more cost-effective, preventive strategies. Another issue is that while primary health care is recognized by health authorities as cost effective, most nurses in rural areas are trained only in curative medicine.

In much of the Pacific, effective health promotion is limited by various factors, including poor access to communications and the media. People in outlying areas may not have access to television or even radio, while national television stations tend to relay overseas material most of the time. While basic health education is usually provided in schools, conservative attitudes of parents may prevent some topics from being addressed, such as safe sex. Conveying health messages to out-of-school populations can be difficult, simply because there are few ways of contacting them other than by deploying peer educators.

C. Sexually transmitted infections and HIV/AIDS

Sexually transmitted infections (STIs) were introduced to most Pacific countries by traders and whalers in the nineteenth century, but did not reach Papua New Guinea until the twentieth century (McArthur, 1967; Hughes, 1997). STIs including syphilis, gonorrhoea, genital ulcers and chlamydia are still endemic in most Pacific island developing countries and territories (WHO, 2004; SPC, 1997, p. 6). The impact of high rates of gonorrhoea and other STIs in the highland provinces of Papua New Guinea were clearly reflected in lower fertility rates for these provinces in the 1980s and 1990s (McMurray, 1995).

The persistence of STIs in the Pacific is largely due to a lack of knowledge about sexual health, lack of access to treatment or reluctance to seek treatment because of stigmatization (Kaitani, 2000). Since the early 1990s, a growing awareness of STIs, especially HIV/AIDS, along with widespread public education campaigns, has gradually increased condom use. Even so, it has taken more than 10 years to make significant inroads into the reluctance of Pacific people to mention in public topics such as STI transmission and condoms, and there is still strong resistance from many quarters.

This conservatism has contributed to a tendency to place unrealistic emphasis on abstinence in education and advocacy programmes, even where it is known that multiple partnering is common, especially among youth and men.

Multiple partnering and STIs facilitate the transmission of HIV, so the Pacific is highly susceptible to HIV/AIDS epidemics. Table 3 shows the number of reported cases as of 31 December 2003.

Although the numbers may seem relatively small, it must be remembered that only a very small proportion of HIV/AIDS cases are seen by health professionals and diagnosed, especially in Papua New Guinea, Solomon Islands and Vanuatu. These statistics almost certainly represent only “the tip of the iceberg” in those countries (SPC, 2004b, p. 12). Another issue that only recently has begun to receive attention in the subregion is mother-to-child transmission of HIV.

Table 3. HIV/AIDS statistics for Pacific island countries and territories, December 2003

	<i>HIV/AIDS cases</i>	<i>Rate per 100,000</i>	<i>AIDS deaths</i>
Melanesia			
Fiji	142	17.1	25
New Caledonia	263	111.8	99
Papua New Guinea	7,320	130.3	1,336
Solomon Islands	2	0.4	1
Vanuatu	2	1.0	2
Micronesia			
Micronesia, Federated States of	14	12.4	7
Guam	176	103.4	68
Kiribati	42	47.7	19
Marshall Islands	9	16.7	2
Nauru	1	8.3	0
Northern Mariana Islands	25	33.2	11
Palau	4	19.7	2
Polynesia			
American Samoa	2	3.3	1
Cook Islands	1	5.6	0
French Polynesia	229	91.6	77
Niue	0	0	0
Samoa	12	6.7	8
Tokelau	0	0	0
Tonga	13	12.8	11
Tuvalu	9	88.2	2
Wallis and Futuna	2	13.5	1

Source: Secretariat of the Pacific Community (2004). “Regional strategy for the prevention and control of STD/AIDS in Pacific countries and territories, 2004-2008”, unpublished draft.

Most Pacific island countries and territories have recognized that HIV/AIDS poses a major threat to health in the subregion, and the implementation of strategies to prevent serious epidemics has been prioritized (Pacific Islands Forum Secretariat, 2002). Despite a widespread community attitude that reproductive health services should be available only to married couples, UNFPA has supported an adolescent reproductive health programme in the subregion since 2001,

and this has made a substantial contribution to increasing condom use among sexually active adolescents (SPC, 2004b). The first Pacific regional HIV/AIDS strategy was formulated and endorsed in 1997, and the 2004-2008 strategy was in draft form at the time of writing. The Pacific has received substantial funding for HIV/AIDS surveillance, prevention and treatment from the United Nations Global Fund to Fight AIDS, Tuberculosis and Malaria (SPC, 2004b).

D. Issues in health service delivery and management

Even though there is a widespread shortage of trained health professionals in the Pacific, migration of health professionals occurs both internationally and within countries. There is a steady flow of trained health personnel to the Pacific Rim countries and also from low-income to higher-income countries within the subregion. For example, Fijian nurses migrate to northern Pacific countries to obtain higher salaries in United States dollars. This is paralleled by in-country movements to central areas because of the difficulty and hardship of working in remote areas (Connell, 2001).

Shortages of trained health professionals mean that lower level facilities sometimes have only untrained or informally trained personnel. Although this is intended as an efficiency measure, it can contribute to the misuse of skilled personnel. In Papua New Guinea, for example, because of substantial disparities in skills between fully trained health professionals and aid post and clinic staff, patients at clinics sometimes insist on being treated by the most highly trained practitioner, refusing services from less qualified personnel. The few trained doctors available may find it difficult to delegate even minor procedures, such as dressing small wounds, to subordinates, even though as long ago as 1986 the National Health Plan stipulated that “no person should be engaged to perform a task if a lesser trained, lesser paid worker could be employed to carry out that task adequately” (Papua New Guinea, 1986, p. 258).

Small population size means few senior posts in health and a limited career structure. In small countries, the most skilled and qualified professionals are likely to be drafted into management, which contributes to wastage of skills. In addition to this, they are often required to travel abroad to participate in policy and planning meetings on a wide range of subjects. When senior staff are absent from their desks so much of the time, in-country management capacity may be compromised.

High levels of donor assistance tend to foster dependency and impose conditions, such as a requirement that donor policies are adopted and drugs and consultants are sourced from donor countries. Different political and financial agendas may result

in fragmentation of activities and conflict in health policies and programmes. Some countries may have 100 or more donor projects operating outside the national health management structure, with the poorest countries tending to have the most fragmentation and the least sustainable systems (Berer, 2002, p. 10).

E. Millennium Development Goals and health information systems in the Pacific

The members of the Pacific Community are committed to the ideals of the United Nations Millennium Development Goals and have endorsed the use of relevant MDG indicators to monitor progress (Parry, 2003, p. 3). At the 13th Regional Heads of Statistics Meeting at Noumea, New Caledonia in August 2003, a committee was formed to evaluate the appropriateness of MDG indicators for Pacific island countries and territories. Subsequently in December 2003, a regional meeting at Suva, Fiji reviewed strategies for collecting MDG indicators and promoting the achievement of MDGs in the Pacific. In addition, the Secretariat of the Pacific Community has customized spreadsheets for the calculation of MDGs and provided in-country assistance on request <<http://www.spc.int/stats/>>.

Despite this commitment and activity, there are some concerns in relation to the use of MDG indicators in the Pacific. A major underlying issue is the question of the measurement of poverty. When MDG indicators were first proposed, there was considerable resistance within the subregion to the notion of “poverty”. In traditional Pacific subsistence society everyone had entitlements to land, and food was easily obtained, while in Pacific cultures the basic unit tends to be the community rather than the individual. It is a matter of pride that communities provide care for all their members, and needy persons or families are cared for by the community “safety net”. Pacific people tend to conceptualize poverty as implying total destitution, picturing desperately thin people living on rubbish dumps or starving in refugee camps. It was therefore argued by many Pacific leaders that poverty does not exist in the Pacific subregion, and cannot be measured in terms of dollars because of the contribution of the subsistence sector.

In fact, as discussed above, increasing numbers of Pacific people living in urban areas have no access to land and little access to cash, while

population pressure is increasing in rural areas. Growing percentages have poor nutrition and poor environmental health, and lack the capacity to utilize health services. Poverty measures are, therefore, very relevant to the subregion to indicate the capacity to be healthy.

The Pacific's MDG committee is currently working on devising appropriate measures of poverty for the subregion that take into account both subsistence and cash. There remains a danger, however, that reluctance to acknowledge disadvantage could lead to underestimation of poverty levels.

Another issue relates to the quality of statistics used to compile MDG indicators, especially those relating to infant, child and maternal health (MDGs 4 and 5). It is clear that the quality, completeness and timeliness of health statistics in Pacific island developing countries and territories are very variable, even though several donors are currently supporting the improvement of Pacific health statistics. AusAID is implementing major projects to help upgrade and improve health information systems in Papua New Guinea, Solomon Islands, Vanuatu and Samoa, and providing substantial support in several others. UNICEF is currently undertaking evaluations of EPI coverage in Kiribati, Papua New Guinea, Solomon Islands and Vanuatu, with others planned, and there are a number of other initiatives to improve health data quality by WHO and other donors in various countries. The underlying cause of deficient data in the Pacific subregion, however, continues to be limitations in staff capacity, and the coverage of and access to health services. Assistance to expand the health services network must, therefore, continue to be prioritized, as this will improve both health and health monitoring.

V. THE WAY FORWARD

This paper has argued that the patterns of morbidity and mortality in the Pacific results from the juxtaposition of traditional and modern lifestyles and traditional and modern values. Reducing morbidity and mortality is not easy because of the diverse nature of Pacific island countries and the limited resources of these generally small economies. As population and development issues interact with health, major improvements in health cannot be expected without substantial improvement in human development (UNDP, 1999). Despite this, it appears that the economic situation of most of the Pacific countries is improving only slowly, if at all. The threat of HIV/AIDS also looms large. Although timely interventions hopefully will prevent epidemics throughout the subregion, it seems inevitable that Papua New Guinea, at least, will experience a major increase in AIDS mortality in the near future.

A promising trend in the Pacific is increasing community awareness of health issues, with both Governments and donors exhibiting high levels of commitment to improving health. For the foreseeable future the first priority will continue to be to work towards giving every citizen access to adequate health services. This is essential to address all aspects of health, including MCH. The next priority would be to increase primary health care and health education, to reduce both infectious diseases and the incidence of non-communicable diseases. In order for these strategies to produce significant improvements in health, however, there must also be basic economic and social development. Donors can promote both health and development by placing greater emphasis on sector-wide interventions and partnerships to link health initiatives with projects that reduce poverty, improve environmental health and raise living standards.

References

- AusAID and Nauru Department of Health (2003). "Review of the health sector", unpublished report.
- Berer, M. (2002). "Health sector reforms: Implications for sexual and reproductive health services", *Reproductive Health Matters*, vol. 10, No. 20, pp. 6-15.
- Connell, J. (2001). "The migration of skilled health personnel in the Pacific region", study commissioned by the World Health Organization, Western Pacific Regional Office, Manila.
- Diamond, I. and P. McDonald (1994). "Mortality" in D. Lucas and P. Meyer, eds., *Beginning Population Studies* (Canberra, Australian National University).
- Frank, J., J. Frijka, J. Bobadilla, C. Stern, J. Sepulveda and M. Jose (1989). "The epidemiologic transition in Latin America", paper presented at the International Union for the Scientific Study of Population meeting, New Delhi, 20-27 September.
- Hughes, J. (1997). "A history of sexually transmitted diseases in Papua New Guinea", in M. Lewis, S. Bamber and M. Waugh, eds., *Sex, Disease and Society* (London, Greenwood Press).
- Inter Financial (1999). "Port Moresby water supply upgrade company funded", press release, 22 June, PacNews, <<http://www.pacnews.com>>.
- Kaitani, M. (2000). "Knowledge, practice and the contradictions: A case study of Fijian men in urban Suva", Demography/Population Discussion Paper No. 2, Noumea, Secretariat of the Pacific Community.
- McArthur, N. (1967). *Island Populations of the Pacific* (Canberra: Australian National University Press/ London, Hurst).
- McMurray, C., 1995. "The challenge of population growth", *Pacific Economic Bulletin*, (Special issue on Papua New Guinea), vol. 10, No. 1, pp. 66-72.
- McMurray, C. and R.H. Smith (2001). *Diseases of Globalization* (London, Earthscan).
- Pacific Islands Forum Secretariat (2002). Agenda Item 8(b) HIV/AIDS, Paper PIFS (02) OSC.29, Suva, Pacific Islands Forum Secretariat.
- Papua New Guinea (1986). *Papua New Guinea National Health Plan 1986-1990* (Port Moresby, Department of Health).
- Parry, G. (2003). "The adoption of the Millennium Declaration – implications for national statistical systems in the Pacific region", unpublished background paper for 13th Regional Heads of Statistics Meeting, Noumea, Secretariat of the Pacific Community.
- Republic of Kiribati (2002). *Report on the 2000 Census of Population* (Tarawa, Kiribati, Republic of Kiribati).
- SPC (Secretariat of the Pacific Community) (2000a). *Lifestyle Diseases in Pacific Communities* (Noumea, Secretariat of the Pacific Community).
- SPC (Secretariat of the Pacific Community) (2000b). *Oceania Population 2000* (wall poster) (Noumea, Demography/Population Programme, Secretariat of the Pacific Community).
- SPC (Secretariat of the Pacific Community) (2001). *Population and Development in the Pacific*, report on the Seminar on Population and Development, 26-30 March, Demography/Population Programme (Noumea, Secretariat of the Pacific Community).
- SPC (Secretariat of the Pacific Community) (2002). *SPESS* (South Pacific Economic and Social Statistics), data accessed from web site on 2 August 2003, <<http://www.spc.int/stats/>>.
- SPC (Secretariat of the Pacific Community) (2004a). Data accessed from web site on 20 August 2004, <<http://www.spc.int/demog/>>.

SPC (Secretariat of the Pacific Community) (2004b). "Regional strategy for the prevention and control of STD/AIDS in Pacific countries and territories, 2004-2008", unpublished draft.

UNDP (United Nations Development Programme) (1999). *Pacific Human Development Report 1999: Creating Opportunities*, (Suva, UNDP).

WHO (World Health Organization) (2002). "Quantifying selected major risks to health", Chapter 4 in *The World Health Report 2002: Reducing Risks and Promoting Healthy Life* (Geneva, World Health Organization).

WHO (World Health Organization) (2004). "Western Pacific Regional Health Database, 2002 Revision", data accessed from web site on 17 August, <<http://www.wpro.who.int/chips/chip02/>>

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PART TWO

Infant, Child and Adult (Maternal) Mortality

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Chapter IV

Infant and Child Mortality in Urban Bangladesh: Are the Migrants and the Poor Disadvantaged?

*M. Mazharul Islam**

Infant and child mortality in Bangladesh has long been a topic of interest to population researchers because of its intricate relationship with issues of fertility and socio-economic development and quality of life. In recent years, it has become one of the important indicators for attainment of the Millennium Development Goals (MDGs). Despite recent declines, infant and child mortality in Bangladesh is still among the highest in developing countries with strong urban-rural differentials. Nearly 1 in 10 children in Bangladesh dies before reaching age 5 years. According to the 1999-2000 Bangladesh Demographic and Health Survey (DHS), infant and under-five mortality rates in Bangladesh are 66 and 94 per 1,000 live births respectively (Mitra and others, 2001).

Indices of infant and child mortality have been consistently better in urban areas than in rural areas. These differentials are due primarily to rural residents having limited access to proper health services and sanitary conditions compared with urban residents (Brockerhoff, 1990; Farah and Preston, 1982). The child survival advantage associated with urban residence in contemporary developing countries has been documented in a large body of demographic literature (Behm and Vallin, 1982; Davis, 1973; Hobcraft, McDonald and Rutstein, 1984). Many rural residents who move to cities do so with the expectation of higher earnings and an improved lifestyle. Intuitively, the search for improved economic status among these migrants is also expected to translate into better health for the family members including children. However, in

recent years, there has been growing recognition that this urban advantage is misleading as a guide for national health strategies insofar as it obscures enormous differences in health status and survival chances within the urban areas of developing countries (World Health Organization (WHO), 1991; Harpham and Stephens, 1991; Brockerhoff, 1995). Based on DHS data from 17 countries, a recent study demonstrates that the child survival prospects of rural-to-urban migrants are higher than those living in their rural place of origin, although lower than those of urban non-migrants (Brockerhoff, 1995). A similar pattern has been found when examining the use of health services among migrant and non-migrant groups (Tam, 1994; Zulkifli and others, 1994; Bender, Rivera and Madonna, 1993).

A recent study on the urban poor in Bangladesh revealed that this group has a worse health situation than the country as a whole (Khan, 1997). The study cited two estimates of infant mortality among the urban poor (from two different sources) at 152 per 1,000 and 180 per 1,000 respectively, which are above the estimates for rural and national levels. Compared with the general population, urban infants in slum communities are extremely vulnerable to disease and death.

A large number of studies described elsewhere (Harpham and Stephens, 1991) demonstrated enormous disparities in child survival chances between poor and wealthier neighbourhoods within the same city, and detailed a variety of threats to child health and survival. Urban areas are growing rapidly and the poor of the world are increasingly urban. This provides both opportunities and new challenges for economic development. In view of the fact that projections indicate that urban families

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in developing countries will increase from 35 per cent of the population in 1975 to more than 79 per cent by the turn of the century, this emerging crisis needs to be acted upon urgently (WHO, 1991; Harpham and Stephens, 1991).

In recent years, most of the cities in Bangladesh have experienced rapid but unplanned urbanization. Rural-to-urban migration has been a major explanation for the dramatic increase in the urban population. While the annual population growth rate is 1.5 per cent at the national level, currently it is more than 5 per cent in most big cities, and it is expected that more than 50 per cent of the population in Bangladesh will live in urban areas by 2025 (World Bank, 1999). The most remarkable characteristic of this urbanization trend is the mushrooming growth of slums and squatters with the increased migration of the rural poor in search of employment and income (Afsar, 2000).

Although the implications of rural-to-urban migration on socio-economic development have been of interest to social scientists, very little work has been done to look at the effect of migration on the health and survival of the most vulnerable members of migrant families, that is, infants and children.

This study analyses the levels and trends of childhood mortality in rural and urban Bangladesh and examines whether children's survival chances are poorer among the urban poor and rural-to-urban migrants. The central questions to be addressed include (a) whether children of migrants from rural areas experience higher child mortality than rural or urban non-migrants and (b) if so, what individual or household characteristics account for this? Rural-to-urban migration in Bangladesh also means that a great number of people are exposed to new environments and potentially to new health effects on mortality. An understanding of the mortality risks associated with rural-to-urban migration and the differential health needs of rural-to-urban migrants relative to life-long non-migrant groups has the potential of influencing health policy and the provision of health services. The study also examines the progress needed towards achieving the MDG related to reducing child mortality.

I. RURAL-TO-URBAN MIGRATION IN BANGLADESH

Bangladesh is predominantly a rural country. In 1951, only 4.3 per cent of the population in what is now Bangladesh was urbanized. During the period 1961-1991, while its population doubled from 55 million to 111 million, the urban population grew almost ninefold from 2.6 million to 22 million. According to the 2001 population census of Bangladesh, the urban population makes up 23 per cent of the country's population of 130 million within a small area of 147,570 square km (Bangladesh Bureau of Statistics (BBS), 2003). As a result, about 30 million people are currently living in urban areas. According to United Nations projections (1998), the size of the urban population in Bangladesh will exceed 50 million by the year 2025.

The urbanization process gained momentum in Bangladesh after its independence in 1971. Between 1990 and 2000, the urban population experienced an annual average growth rate of 5.6 per cent, which is the highest rate among South Asian countries (BBS, 2003). Urban growth in Bangladesh is predominantly an outcome of rural-to-urban migration, which is estimated to contribute between three fifths to two thirds of urban growth (United Nations, 1993a, pp. 2-16) and about three quarters to four fifths of the urban poor representing migrant groups in the "mega city" of Dhaka, the country's capital (Centre for Urban Studies (CUS), 1990; Mojumdar, Mahmud and Afsar, 1989). In the urbanization process, Dhaka plays the most dominant role. This city alone contains one third of the urban population of Bangladesh (United Nations, 1993b, p. 25), with an estimated population of around 10 million; thus, it has entered the "club" of the top 10 mega cities of the world.

In a recent study, Afsar (2000) observed a positive relationship between economic development and urbanization. The study noted that rural-to-urban migration in Bangladesh involves those from both the low and high socio-economic strata. For the poor in rural areas, urbanward migration is predominantly a poverty alleviation strategy, whereas for the rich, such migration is a strategy for obtaining a better education, and for health and economic accumulation (Afsar, 2000). The propensity to migrate to an urban area is highest among educated people in rural areas, with the availability

of employment in the major urban areas, particularly Dhaka and other major cities, providing the main attraction for migration. However, with regard to the social impacts of migration, it was found that migration per se does not change one's attitudes. Nonetheless, the nature of migration (long and short duration) and educational attainment tend to be associated with attitudinal change.

II. DATA AND METHODS

The data for the study come from the 1999-2000 Bangladesh DHS, which covered a nationally representative sample of 10,544 ever-married women aged 10-49 years, 3,150 (30 per cent) of whom were residing in urban areas. The Bangladesh DHS defined cities, towns and municipalities (other urban) as urban areas. In addition to current place of residence (categorized as city, town, or countryside), the survey collected basic information on childhood residence, the number of years the respondents spent in the current place of residence (coded in single years, always and visitors) and type of residence prior to the most recent migration. Using this information, it is possible to identify four migration streams: those who had moved from (a) a rural to rural area, (b) an urban to urban area, (c) a rural to urban area and (d) an urban to rural area. In this study, a migrant is defined as a person who has changed place of residence across an administrative boundary. Visitors were excluded from the analysis. A woman who reported childhood and previous residences as rural and current residence as urban was classified as a rural-to-urban migrant. The non-migrant groups of respondents were classified as rural natives and urban natives based on their reported duration at the current residence classified as "always". The critical shortcomings of the Bangladesh DHS data are that migrants included at the time of the survey are representative of all migrants who entered the city or town in terms of personal characteristics related to child health and survival and that migrant women are not significantly more likely than non-migrants to look after young children born after migration.

In order to reduce the influence of recall bias on the reporting of children's age at the time of death, the analysis was restricted to children born in the five-year period prior to the survey. Hence, the analysis takes into account births during the period 1995-1999. In addition, the unit of analysis is the

child, not the mother. Therefore, a sample of children was created from the female respondent data set. The analysis henceforth refers to information on the children while also attaching to each child a record of the mother and household.

The Cox proportional hazard model is used to estimate the relationship between migration and other explanatory variables (such as socio-economic and demographic characteristics of mothers) and infant and child survival in order to allow for censoring. The underlying logic, advantages and limitations of the proportional-hazard model developed by Cox (1972) have been illustrated in a number of studies (Trussell and Hammerslough, 1983).

In the absence of income or consumption data collected by the household surveys, household ownership of assets (wardrobe, radio, television etc.), as well as household construction, and the availability of a supply of clean water and sanitation were used as the basis for constructing a wealth index for each household in the study. The wealth index was constructed with coding depending on whether the household had the asset or not. The principal component analysis was conducted to find the linear combination of the most important household asset variables that would explain the maximum possible variation in household income status (Filmer and Pritchett, 1999; Wagstaff and Watanabe, 2002).

III. LEVELS AND TRENDS OF INFANT AND CHILD MORTALITY IN URBAN BANGLADESH

Table 1 presents the estimates of infant and under-five mortality by urban-rural place of residence for the three five-year periods preceding the survey. The mortality indicators have been calculated using the life-table approach, which provides probability of dying from birth to exact ages 1 and 5 per 1,000 live births. Under-five mortality for the recent five-year period (which roughly corresponds to the years 1995-1999) is 94 per 1,000 births. This means that nearly 1 in 10 children born in Bangladesh dies before reaching his or her fifth birthday. About 70 per cent of the deaths under age 5 years occur in the first year of life; the infant mortality rate is 66 per 1,000 live births. The infant and child mortality rates show declining trends over the period from 1985-1989 to 1995-1999.

Table 1. Levels and trends in infant and child mortality by place of residence in Bangladesh, 1985-1989 to 1995-1999

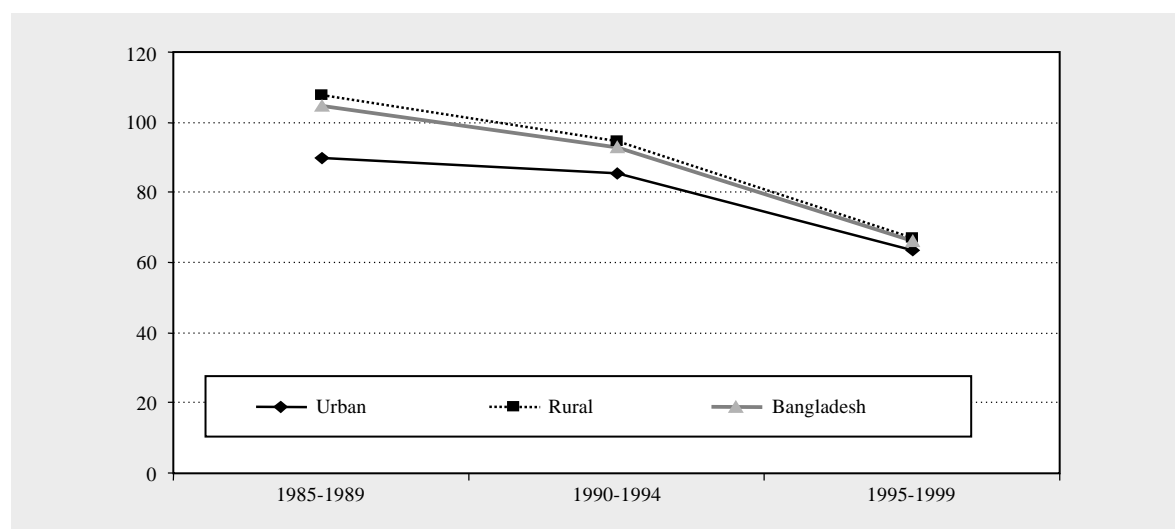
Reference period	Urban		Rural		All	
	IMR ^a	U5 ^b	IMR	U5	IMR	U5
1995-1999	63.3	81.6	66.9	96.6	66.3	94.0
1990-1994	85.3	111.5	94.4	128.6	92.8	125.7
1985-1989	89.9	118.6	107.7	158.8	104.6	151.5
Percentage decline over period 1985-1989 to 1995-1999	30	31	38	39	37	38

^a IMR = infant mortality rate per 1,000 live births.

^b U5 = Under-five mortality rate per 1,000 live births.

The survey data demonstrate consistently higher child survival in urban areas. However, the urban-rural differentials in child survival appear to have diminished in recent years. For example, the infant mortality rate was only marginally better in urban Bangladesh than in rural areas in the period 1995-1999 (63 versus 67 per 1,000), a differential

that was substantially lower than earlier figures in the period 1985-1989 (90 versus 108 per 1,000) (figure 1). Although mortality is declining in both urban and rural areas, the decline is much slower in urban areas than in rural areas. Over the last 10 years, infant mortality declined by 30 per cent in urban areas compared with 38 per cent in rural areas (table 1).

Figure 1. Infant mortality in urban and rural Bangladesh in the period 1985-1989 to 1995-1999

Source: Bangladesh Demographic and Health Survey 1999-2000.

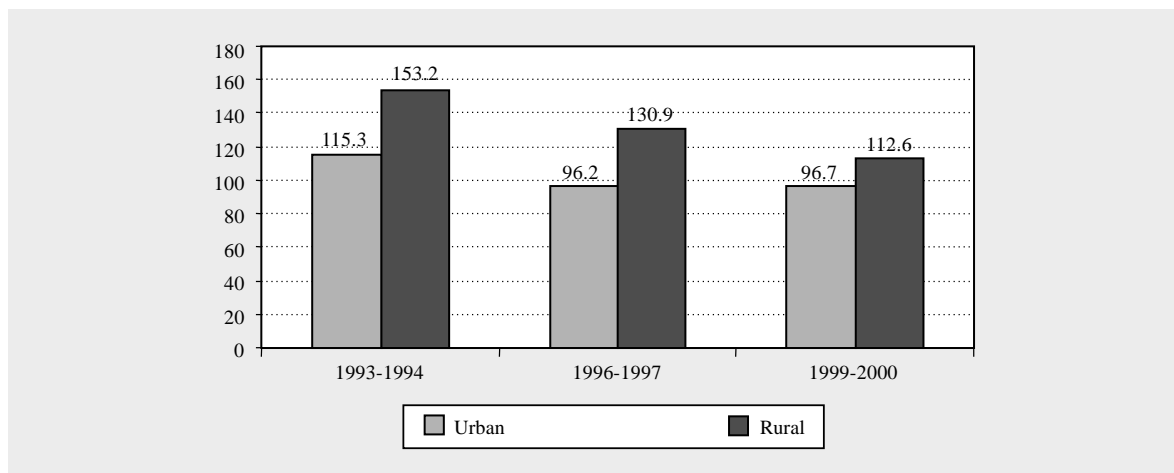
Further evidence of diminishing urban-rural differentials in childhood mortality comes from a comparison of the data from the last three successive DHSs conducted between 1993/1994 and 1999/2000 (figure 2). The results indicate that the urban-rural differentials in childhood mortality have narrowed in recent years, and in urban areas childhood

mortality has remained almost unchanged since 1996. This may be due partly to the change in the definition of urban area in the 1999-2000 Bangladesh DHS, which unlike the 1996-1997 survey, considered other urban domains as urban areas. As expected, it is the rapid growth of urban populations as a result of rural-to-urban migration in

Bangladesh that explains the demographic change in urban areas. However, the rate and the pattern of rural-to-urban migration are not always synonymous with socio-economic improvements for migrants. The migrants may be particularly disadvantaged in terms of health as they live in enclaves or “urban villages” where traditional rural behaviours persist;

they may also continue to experience economic and psychological problems of adjustment and lack political representation (Abu-Lughod, 1961; McGee, 1967; Brouckerhoff, 1995). The problems migrants face will be examined in the next section by analysing child survival status by migration status and urban native status.

Figure 2. Trends in under-five mortality in urban and rural areas, 1993-1994 to 1999-2000



Source: Bangladesh Demographic and Health Survey 1999-2000.

IV. ARE URBAN MIGRANTS DISADVANTAGED?

Table 2 presents infant (under one year of age), child (1 to 4 years of age) and under-five mortality rates during the period 1995-1999 for children as well as selected indicators of child health-care utilization of urban and rural natives and rural-to-urban migrants. A sharp differential in childhood mortality and child health-care utilization has emerged between migrants and non-migrants. Urban migrants appear to be greatly disadvantaged in terms of child survival. Under-five mortality is 1.6 times higher among children of urban migrants compared with the children of urban natives (102 and 62 per 1,000 live births respectively). Even long-time migrants (living in urban areas for 10 years or more) who have lived in urban areas for an average of 16 years, having already adapted to the urban environment over this period, experienced higher childhood mortality than life-long urban residents.

The disadvantaged condition of urban migrants is also evident from the relatively poor rate of utilization of health care among the children of urban migrants compared with urban natives. For example, 42 per cent of the children of rural-to-urban migrants received antenatal care compared with 62 per cent of the children of urban natives. Similarly, coverage for different types of vaccination is lower among the children of rural-to-urban migrants than those of urban natives. Thus, there are two distinct child mortality regimes operating in urban Bangladesh, one for natives and the other for migrants. Possible reasons for urban child mortality differences between natives and migrants at the individual level are explored later.

It also seems, however, that rural-to-urban migration promotes child survival. Children born to migrants, after having settled in the city, experience an under-five mortality rate of 98 per 1,000 live births compared with 117 per 1,000 live births for children born before migration. This may reflect, in part, the declining trend of child mortality in

Table 2. Estimated index of childhood mortality and health-care utilization of urban and rural natives (life-long residents) and rural-to-urban migrants, 1995-1999

<i>Indices</i>	<i>Rural-to-urban migrants</i>			<i>Natives</i>	
	<i><10 years</i>	<i>10+ years</i>	<i>All</i>	<i>Urban</i>	<i>Rural</i>
Infant mortality rate ^a	86.1	72.2	81.7	50.6	75.6
Child mortality rate ^a	26.3	17.3	22.6	14.5	43.8
Under-five mortality rate ^a	110.2	88.2	102.4	62.3	116.2
Under-five mortality before migration ^a	–	–	116.9	–	–
Under-five mortality after migration ^a	–	–	98.5	–	–
Utilization of health care (%):					
Delivery in health facility	20.3	16.3	19.1	33.2	4.0
Antenatal care from doctor	43.9	39.4	42.5	61.7	16.7
Doctor-assisted delivery	17.9	11.9	16.1	28.5	3.7
Child vaccination (%):					
Bacille Calmette Guérin (tuberculosis)	94.4	95.1	94.5	95.3	89.4
Diphtheria-pertussis-tetanus ^b	80.6	75.6	79.4	85.1	69.2
Polio ^b	79.0	73.2	77.6	80.4	68.5
Measles	78.2	70.7	76.4	86.5	67.5

^a per 1,000 live births.^b 3 or more doses.

Bangladesh as a whole over the period. The results also suggest that rural-to-urban migration improves child survival and health status. This has been confirmed by the lower rate of childhood mortality among migrant children than the children of rural natives. For example, the under-five mortality rate is 102 per 1,000 live births among migrant children compared with 116 per 1,000 live births among rural natives. This difference is probably due in part

to positive migrant selection since the mortality rate of migrant children is substantially lower than that of the children of rural natives. Infant and child mortality also declines substantially with duration of residence in a city. For example, under-five mortality declines from 110 per 1,000 live births for recent migrants (within the last 10 years) to 88 per 1,000 live births for long-time migrants (more than 10 years).

Table 3. Percentage of urban and rural natives and rural-to-urban migrant women aged 15-49 who lack basic household amenities and sufficient food, 1999-2000

<i>Basic household amenities</i>	<i>Rural-to-urban migrants</i>			<i>Natives</i>	
	<i><10 years</i>	<i>10+ years</i>	<i>All</i>	<i>Urban</i>	<i>Rural</i>
Reside in dwellings without electricity, flush toilet or piped drinking water	16.8	23.2	19.7	15.6	76.6
Reside in natural or rudimentary housing ^a	32.1	36.6	34.1	28.3	67.2
Own no major consumer durables ^b	20.9	17.8	19.5	13.2	39.1
Have food deficit regularly	42.3	53.7	47.4	42.5	61.9

^a Constructed wholly or in part of earthen materials.^b Do not own wardrobe, television, radio or watch.

The migrant-native mortality differentials shown in table 2 correspond fairly well with the differences in socio-economic status shown in table 3. Rural-to-urban migrants have moderately lower socio-economic status than their urban native counterparts. For example, rural-to-urban migrant women are more likely than lifetime urban residents to live in dwellings that lack basic amenities such as electricity, piped drinking water or a flush toilet, and are constructed of non-durable, natural materials. This clearly reflects the inferior economic status of migrants compared with that of urban natives. Similarly, higher percentages of migrants than urban natives tend not to own a major consumer durable item and lack sufficient food for a whole year, indicating the low income level of this group compared with life-long urban natives.

V. EVIDENCE OF MIGRANT SELECTION AND ADAPTATION

Table 4 presents the socio-economic and demographic characteristics that are related to migrant selection and adaptation, which account for the

differential child mortality among migrant and non-migrant subgroups. Since most of the data pertaining to the current status of migrants also reflect the adaptation of this group's post-migration patterns, there is very little choice in terms of measures for migrant selection. Nevertheless, in this study, women's age, children ever born at the time of migration or level of education (since the most recent rural-to-urban migration usually occurred after the age of 15) were taken as measures of migration selection. The result indicates that recent migrants (with less than 10 years of residence in the urban areas) are relatively younger than urban or rural natives. However, they tend to arrive in the urban areas at a more mature age than long-time migrants (at ages 23 and 18 respectively). A more advanced age may translate into superior child-care practices; on the contrary, a younger age may result in greater exposure to and easier adoption of more modern child-care practices associated with lower child mortality. This hypothesis is supported by the findings in table 2, which indicate that recent migrants are more likely to adopt child-care practices and reproductive health-care services than long-term migrants.

Table 4. Percentage of native and rural-to-urban migrant women aged 15-49 by selected characteristics, 1999-2000

<i>Socio-economic and demographic characteristics</i>	<i>Rural-to-urban migrants</i>			<i>Natives</i>	
	<i><10 years</i>	<i>10+ years</i>	<i>All</i>	<i>Urban</i>	<i>Rural</i>
Mean age (years)	26.7	35.8	30.8	29.2	30.0
Mean duration in urban areas (years)	3.6	18.1	10.2	—	—
Mean age at time of migration (years)	23.1	17.7	20.6	—	—
Mean children ever born at time of migration (number)	1.51	0.78	1.27	—	—
Mean age at first marriage (years)	15.7	14.8	15.3	16.3	14.5
Primary or higher schooling (%)	69.2	57.5	63.9	73.1	49.4
Husband no schooling (%)	25.6	32.2	28.6	20.6	44.2
Husband with white-collar job (%)	40.1	42.7	41.3	51.9	22.7
Two or more tetanus injections (%)	54.6	54.1	54.4	61.9	44.2
Ever use of contraceptive (%)	71.4	79.4	75.0	79.2	64.9
Owens (%):					
Television	46.6	42.2	44.6	52.0	11.2
Radio	44.4	45.1	44.7	58.1	30.3
Wardrobe	42.5	47.3	44.7	59.3	22.2
Watch	74.6	77.2	75.8	82.7	52.7
Piped water (%)	29.0	22.7	26.1	28.2	0.4
Flush toilet (%)	35.1	30.3	32.9	41.1	4.9
Cement/concrete floor (%)	54.1	45.7	50.3	59.9	6.6
Brick/cement wall (%)	51.7	47.2	49.7	58.2	10.1
Number of cases	918	763	1,681	1,288	6,595

Note: Number of children ever born at age when < 10- year migrants moved was 2.13 for rural natives and 1.73 for urban natives. The number of children ever born at age when 10+ - year migrants moved was 1.49 for rural natives and 1.14 for urban natives.

Fertility selection is also partly determined by age at migration and age at first marriage. The mean number of children ever born to long-time migrants at the time they left the rural areas was low (nearly 1 child), indicating that many of these women experienced a first birth and births in their teens, both of which are often associated with a higher risk of child mortality in urban areas. The mean number of children ever born to recent migrants (1.51 children) at the time they left the rural area is very close to the mean number of children ever born to urban non-migrants (1.73 children) of the same age at the time (see footnote in table 4), suggesting that the subsequent urban child mortality risk related to fertility is fairly close for the two groups. This is in spite of age at first marriage being higher among migrants than their rural native counterparts, although it is lower than that of urban natives.

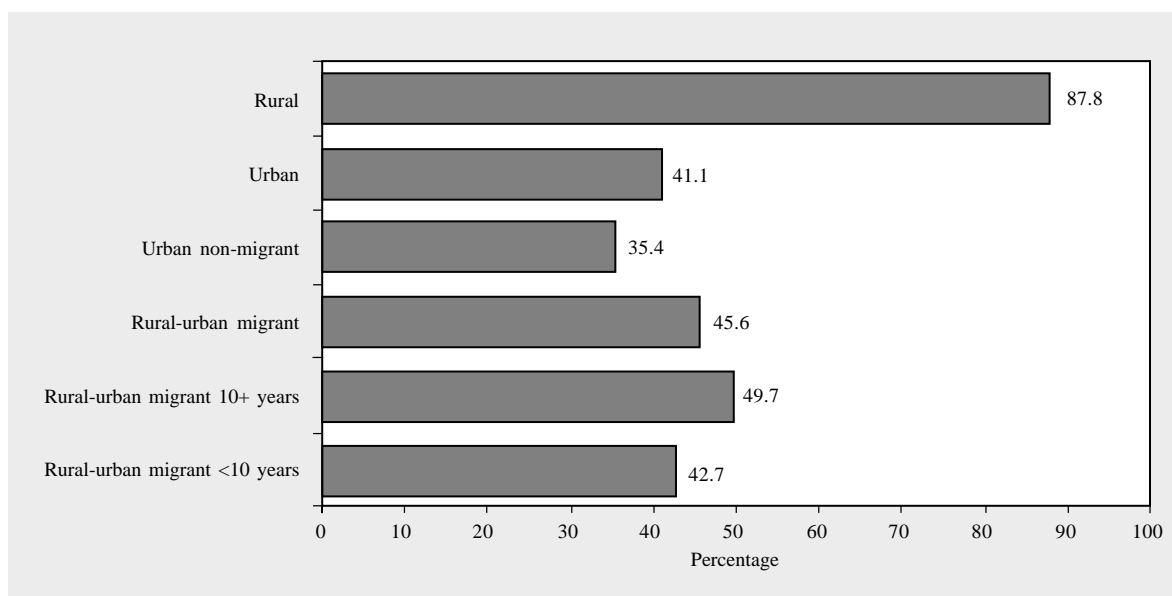
In terms of education, most rural-to-urban migrants appear to be rural women who received at least a primary school education; 64 per cent of migrants, compared with 49 per cent of rural non-migrants, received at least a primary level education. Migrant women are less educated than urban natives. Since maternal education and child mortality are negatively associated, the higher level of maternal education among urban migrants might contribute to lower mortality among urban migrant children than rural non-migrant children.

Measures of adaptation as presented in table 4 reveal that, even though female rural-to-urban migrants in Bangladesh may improve their standard of living substantially compared with women who remain in rural areas, migrants generally do not attain the standard of living enjoyed by urban natives regardless of their duration of stay in urban areas. For example, a smaller percentage of urban migrants than natives live in households equipped with piped water, a flush toilet, concrete/cement floor, brick/cement wall and own consumer durables. In the same vein, a smaller percentage of urban migrant women have husbands with white-collar jobs. The similar figures of recent and long-time migrants for these variables, despite the dramatic difference of 15 years between the two groups in mean years of residence, suggest that many persons from the countryside are absorbed into less privileged migrant neighbourhoods.

VI. EVIDENCE OF URBAN POVERTY AND CHILD SURVIVAL

Figure 3 shows the percentage of women of reproductive age living in absolute poverty, by migrant and non-migrant status. Women who live in absolute poverty are those living in dwellings that lack electricity, piped drinking water, or a flush toilet, and are constructed wholly or in part of non-durable earthen materials, and who do not own

Figure 3. Percentage of women aged 15-49 living in absolute poverty condition, by urban, rural and urban-rural migration status



a wardrobe, television or watch and who also live in households that lack sufficient food for the whole year. According to this composite measure, in urban areas household poverty is more prevalent among migrants, particularly long-time migrants, than life-long urban residents. Similarly, poverty remains much more common, and probably more extreme, in rural areas than in urban areas in Bangladesh.

Table 5 presents infant and child mortality rates among the poor and non-poor, according to urban and rural residence and urban migrants. The results indicate that, while the urban women who are living in modern houses with modern facilities (that is, they are economically well off or non-poor) have considerably lower infant and child mortality than their rural counterparts, the urban women

residing in non-modern housing (that is, poor women) have higher infant and under-five mortality rates than those of rural women. Poor and non-poor childhood mortality differentials are higher in urban areas than in rural areas. Table 5 also reveals that, within the urban areas, the child survival status is worse among the migrant poor than the average urban poor, especially among recent migrants. The results confirm that the urban poor are more disadvantaged in terms of child survival than the urban non-poor as well as rural poor. The results also support the findings of many previous studies that housing conditions such as household construction materials and access to safe drinking water and hygienic toilet facilities are the most critical determinants of child survival in urban areas of developing countries (Mosley and Becker, 1991; Timaeus and Lush, 1995; DaVanzo, 1988).

Table 5. Estimated infant and under-five mortality rates per 1,000 among the poor and non-poor, according to urban and rural residence and urban migration status, 1995-1999

<i>Economic status and mortality indices</i>	<i>Urban migrants</i>			<i>Urban</i>	<i>Rural</i>
	<i><10 years</i>	<i>10+ years</i>	<i>All</i>		
Poor					
Infant mortality rate ^a	108.5	90.5	102.1	85.7	68.8
Under-five mortality rate ^a	140.6	109.7	127.7	115.6	100.1
Non-poor					
Infant mortality rate ^a	60.6	42.4	55.8	42.9	47.8
Under-five mortality rate ^a	77.4	53.4	71.1	51.3	61.9

^a per 1,000 live births.

Further evidence of the poverty and child survival relationship can be explored by analysis of wealth quintiles. Wealth quintiles are expressed in terms of quintiles of individuals in the population

(for example, women in the reproductive age group) rather than quintiles of individuals at risk (for example, live births) for any health indicator. Table 6 shows under-five mortality rates by the wealth

Table 6. Under-five mortality levels (per 1,000 live births), by wealth quintiles, according to population subgroups, 1995-1999

<i>Population groups</i>	<i>Wealth quintile</i>					<i>National average</i>	<i>Poorest/ richest</i>
	<i>Poorest</i>	<i>2nd</i>	<i>3rd</i>	<i>4th</i>	<i>Richest</i>		
Bangladesh	119.5	104.4	79.6	82.9	53.6	94.0	2.2
Rural	119.3	102.1	78.3	73.5	66.3	96.6	1.8
Urban	120.2	137.8	96.9	105.4	47.6	81.6	2.5
Rural-to-urban migrant	128.8	147.7	129.0	119.9	62.8	102.4	2.1

quintiles according to population subgroups. The results indicate that children from poor families are more likely to die than children from better off families. For example, the under-five mortality rate of the poorest 20 per cent of the population is more than two times that of the richest 20 per cent in Bangladesh. This poorest-richest differential in childhood mortality is higher in urban areas than in rural areas. The poorest population in urban areas has higher child mortality than that in rural areas. However, the richest have substantially lower mortality in the urban areas than those living in rural areas. Within the urban areas, rural-to-urban migrants have higher childhood mortality than the average urban population irrespective of wealth quintiles.

VII. MULTIVARIATE ANALYSIS

To estimate the relationship between rural-to-urban migration and the probability of a child dying before age five, multivariate proportional hazard

models were used (Cox, 1972), since our dependent variable is a time-dependent stochastic variable (age of the child at death in this case) with censored observations (child is alive at the time of the survey). A series of models were fitted to estimate the relative risk of dying of a child within the first five years of the child's life in the five-year period preceding the survey. Model I in table 7 provides overall estimates of the relative risks of death faced by children of urban migrants and non-migrants and rural children, while Model II tests whether migrant/non-migrant and rural-urban differentials in mortality remain significant after controlling for socio-economic and bio-demographic characteristics of mothers. Table 8 is based on urban births only, which is of the greatest interest to urban health planners. Model III in table 8 provides estimates of the relative risk of childhood mortality among urban migrants and non-migrants and Model IV estimates the relative risk of childhood mortality after controlling for a set of explanatory variables that were expected to have an impact on child mortality.

Table 7. Cox proportional hazards model of the relative risks of under-five mortality (0-59 months), by place of residence and migration status (total sample)

<i>Covariates</i>	<i>Relative risk</i>	
	<i>Model I</i>	<i>Model II</i>
Migration status		
Urban native (ref.)	1.00	1.00
Rural native	1.87**	1.63**
Rural-to-urban migrant		
< 10 years	2.22**	2.10**
10+ years	1.27*	1.07
Other migrant	1.65**	1.42*
Place of residence		
Urban (ref.)		1.00
Rural		1.33*
Sex of child		
Male		1.02
Female (ref.)		1.00
Mother's education		
No education (ref.)		1.00
Primary		1.01
Secondary +		0.84**
Mother's parity		0.91*
Mother's relationship to household head		
Head		0.81**
Other persons		1.11*
Spouse (ref.)		1.00
<i>(Continued)</i>		

Table 7 (Continued)

<i>Covariates</i>	<i>Relative risk</i>	
	<i>Model I</i>	<i>Model II</i>
Mother's work status		
Yes		1.02
No (ref.)		1.00
Household economic status (wealth quintile)		
Poorest		2.78**
2 nd		2.04**
3 rd		1.53**
4 th		1.51**
Richest (ref.)		1.00
Family size		
0-3		1.08
4-6		1.18*
7+ (ref.)		1.00
Husband's profession		
Professional/technical/managerial (ref.)		1.00
Other		1.02
Length of preceding birth interval (months)		
Less than 18		2.36**
18-35		1.66**
36+ (ref.)		1.00
Mother's age at child's birth (years)		
<20		1.52*
20-35 (ref.)		1.00
36+		1.23*

Note: * Significant at $p < 0.01$, ** $p < 0.001$.

ref. = reference category.

Models I and II in table 7 show a higher risk of under-five mortality among the rural-to-urban migrants in general, and the recent migrants (less than 10 years before the survey) in particular, than among the life-long residents of urban areas. The risk of under-five mortality among recent migrants is even higher than that among children born to rural women. There is close agreement between the findings of the bivariate analysis in table 2 and the multivariate analysis in table 7, indicating higher childhood mortality among urban migrants than urban natives. The migrant/non-migrant differentials, especially for the recent migrants, remain significant even after controlling for socio-economic and demographic characteristics. Thus, the results confirm the generally higher child mortality levels of urban migrants than life-long urban and rural residents. This indicates that the place of residence itself is an important correlate of child survival, and the differences may be explained by differential access and use of maternal and child health-care services, which were not examined in this study.

One of the central areas of focus in this study was to examine whether child survival differs significantly among the migrants and non-migrants within urban areas. Models III and IV tested this, considering the children born in urban areas only. The results, which are presented in table 8, indicate that, compared with the children of urban natives, the children of both recent and long-term migrants have a higher risk of under-five mortality. However, the difference is significant among recent migrants, who have a 77 per cent higher risk of under-five mortality than urban natives. After controlling for socio-economic and bio-demographic characteristics, recent migrants show a significantly higher risk of mortality, but long-term migrants show significantly lower mortality compared with urban natives. This result supports the gradual convergence of migrant and non-migrant behaviours and living conditions implied by concepts such as migrant assimilation and adaptation in urban areas (Brockerhoff, 1995).

The results in table 8 underscore the importance of the mother's education, especially beyond secondary levels, to child survival in urban areas. Children born to mothers having a secondary or higher level of education have a 40 per cent lower risk of mortality than the children born to mothers who have no education. However, mothers with primary schooling do not experience significantly lower childhood mortality risks than mothers with no schooling. Children of working mothers experience a greater risk of mortality during childhood than children of mothers who do not work outside the home in order to earn cash. Unlike women from poorer families, women from wealthier backgrounds are less likely to work outside the home unless they are educated. As such, most working mothers come from lower socio-economic classes and work mainly in the non-formal sectors, including as domestic helpers in other people's houses. The occupation of the father also has a significant effect on child survival. The likelihood of child survival is higher among children born to mothers whose husbands have white-collar jobs than children born to mothers with husbands who have non-white-collar jobs.

The mother's parity shows a negative association with risk of under-five mortality. The risk of under-five mortality decreases by 3 per cent for each increase in parity. This is partly due to the fact that mother's high parity is related to the older age of such a mother and, thus, her greater experience and knowledge about child health care.

The number of members in the household appears to have a significant impact on the chances of survival of children, but in a positive way. When migration status, maternal characteristics and household factors were controlled, as the size of the household increased, the likelihood of survival for under-five children increased significantly. For example, children born to a family with fewer than four members experience a 56 per cent higher risk of mortality than children born into families with seven or more members. This finding is contrary to the "resource dilution" perspective that a large household implies limited resources for children and, hence, it possibly lowers the chances of survival (Ssengonzi, De Jong and Stokes, 2002; Casterline, Cooksey and Ismail, 1989; Desai, 1992; Lloyd and Gage-Brandon, 1993). Given this finding, it may be concluded that large households may

actually lead to more resources being made available through the contributions of different household members. In addition, the larger the household size, the more likely it is that older members will help the mother with childcare.

Household headship also has a significant effect on the survival of children. For example, after controlling for migration status, the mother's characteristics and household factors, children living in a household headed by their mothers have a 36 per cent lower chance of dying than children who live in a household headed by a person other than their mother or their father/stepfather. On the contrary, children living in households headed by other persons had a 78 per cent greater chance of dying compared with those in households headed by their father/stepfather. In a society in which women have fewer chances for economic and educational advancement, this finding underscores how mothers' resources translate more positively into child survival when they head the household. Yet, these findings also highlight the relative disadvantage faced by children who live in households headed by persons other than their parents. More importantly, the foregoing analysis reveals that maternal and household factors partly explain infant and child survival patterns in urban Bangladesh. This, however, does not imply that the effects of migration on child survival have diminished, but they become more accentuated after controlling for maternal and household factors.

Household economic status measured by a composite index of household assets and environment shows a significant effect on the risk of under-five mortality. Children born to the poorest families have more than twice the risk of mortality as children born to the richest families. The presence of electricity, safe drinking water and hygienic toilets in the dwelling, as well as modern housing conditions significantly lower the risk of childhood mortality. These amenities are virtually absent among the poorest households in urban slums or peri-urban areas. On the contrary, the low risk of childhood mortality associated with ownership of household durables, such as a television and wardrobe, may result from exposure to "modern" ideas of hygiene, childbearing and use of modern health care, although it is more likely that ownership of valuable assets among women also indicates a higher economic status.

Table 8. Cox proportional hazards models of the relative risks of under-five mortality (0-59 months) in urban areas

<i>Covariates</i>	<i>Relative risk</i>	
	<i>Model III</i>	<i>Model IV</i>
Migration status		
Urban native	1.00	1.00
Rural-urban migrant		
< 10 years	1.77**	1.68**
10+ years	1.03	0.91*
Sex of child		
Male		1.18*
Female (ref.)		1.00
Mother's education		
No education (ref.)		1.00
Primary		0.87
Secondary +		0.60**
Mother's parity		0.97*
Mother's relationship to household head		
Head		0.64*
Other persons		1.78*
Spouse (ref.)		1.00
Mother's work status		
Yes		1.25*
No (ref.)		1.00
Household economic status (wealth quintile)		
Poorest		2.14**
2 nd		1.57**
3 rd		1.45*
4 th		1.32*
Richest		1.00
Family size		
0-3		1.56**
4-6		1.32**
7+		1.00
Husband's profession		
Professional/technical/managerial (ref.)		0.79**
Other		1.00
Length of preceding birth interval (months)		
Less than 18		2.53**
18-35		1.52**
36+ (ref.)		1.00
Mother's age at child's birth (years)		
<20		1.48*
20-35		1.00
36+		1.13*

Note: * Significant at $p < 0.01$, ** $p < 0.001$.

ref. = reference category.

The results show that short birth intervals and very young and old maternal ages at birth increase the risk of child mortality. Children born to adolescent mothers as well as mothers aged 36 years and older face a greater risk of death than children born to mothers aged 20-35 years. The risk of childhood death decreases with the increase of birth intervals. For example, the risk of child death is 2.5 times higher when there was a birth in the preceding 17 months compared with a birth that took place after 36 months subsequent to the preceding birth. This finding is consistent with previous studies in Bangladesh and elsewhere (Miller and others, 1992; Haaga, 1989; Hobcraft, 1991; Pebley and Millman, 1986). These findings have important implications for child survival programmes that promote longer birth spacing and the prevention of adolescent childbearing in high mortality settings such as Bangladesh where large families are still preferred.

VIII. PROGRESS TOWARDS MILLENNIUM DEVELOPMENT GOALS ON CHILD MORTALITY AND MATERNAL HEALTH

The MDGs have enjoyed widespread support and acceptance from both developing and developed countries and from international development agencies since their introduction in September 2000 at the United Nations Millennium Summit. The appeal of the goals is understandable, since they provide the hope of a much improved world by 2015, when extreme poverty is to be halved, all children are to have access to primary school education and infant, child and maternal mortality are to be greatly reduced. Since the adoption of the goals, there has been much debate

over how well the MDGs capture the aspirations of developing countries. The specific targets and indicators associated with the MDGs provide a framework for quantifying many of the desired outcomes and building agreements on the actions for achieving them. The MDGs call for reducing under-five mortality rates by two thirds, using 1990 as the benchmark year and 2015 as the target date.

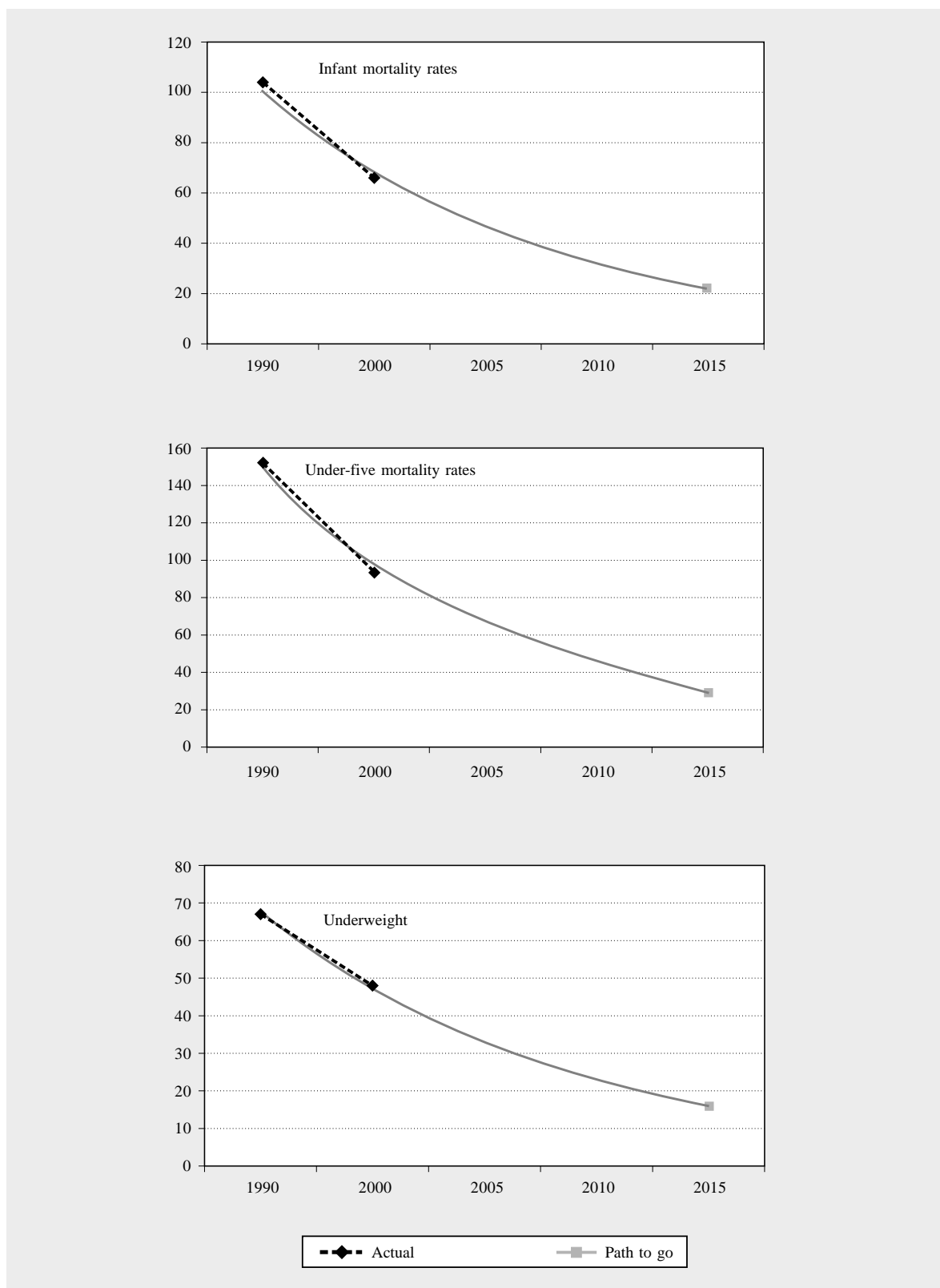
The Government of Bangladesh is fully aware of the importance of the MDGs and has adopted policies and programmes to achieve the Goals. In order to examine the feasibility of the targets in the light of the MDGs, a comparative analysis between projected targets and the actual pace of achievement during the 1990s has been made. The targets are projected by using the year 2000 as the new benchmark.

Table 9 presents the projected targets with 2000 as the benchmark year and the actual pace of achievement during the 1990s. A comparison of the projected targets with the actual pace of progress achieved during the 1990s shows that for all indicators, while being higher than the actual trends, these are not far off the mark (figure 4). The projected reduction rates for child mortality and child nutrition are higher than the average progress recorded in the 1990s. This means that, for the relevant goal to be achieved, the pace of progress will need to increase significantly. The gap between the required annual progress rate and the achieved annual progress rate during the 1990s is wider for child nutrition than for child mortality. These findings emphasize the need for a renewed emphasis on child health care and child nutrition programmes to achieve the MDGs in Bangladesh.

Table 9. Projected targets with 2000 as the benchmark year and the actual pace of achievement during the 1990s for child mortality and maternal health indicators

<i>Indicators</i>	<i>1990</i>	<i>2000 (benchmark data)</i>	<i>Progress over 1990- 2000 (%)</i>	<i>Annual progress over 1990-2000 (%)</i>	<i>2015</i>	<i>Annual progress over 2000-2015 (%)</i>
Infant mortality rate (per 1,000)	105	66	-37.1	-3.7	22	-4.4
Under-five mortality rate (per 1,000)	152	94	-38.1	-3.8	31	-4.5
Percentage of children underweight	67	48	-28.4	-2.8	16	-4.4
Maternal mortality ratio (per 100,000)	480	322	-32.9	-3.3	81	-5.0

Figure 4. Past trends and future progress required to achieve childhood and maternal mortality targets



Fortunately, much is known about the causes of infant and child mortality, including the importance of clean water and the benefits of oral rehydration therapy for diarrhoea, the role of vaccinations, especially against measles, the value of insecticide-treated mosquito nets and prophylactics for malaria prevention and treatment in reducing maternal mortality.

IX. CONCLUSION

The study demonstrates that rural/urban residence has a significant effect on child mortality in Bangladesh, independent of the characteristics of mothers and children. Although child mortality is consistently lower in urban areas, the urban-rural differentials in child mortality have been diminishing in recent years because the declining trends in child mortality in urban areas are slowing compared with the rural areas. Over the last 10 years, infant mortality declined by 30 per cent in urban areas compared with 38 per cent in rural areas. The last three successive DHSs in Bangladesh conducted between 1993/1994 and 1999/2000 also indicate that the urban-rural differentials in child mortality have narrowed in recent years, and in urban areas child mortality remained almost unchanged since 1996, although it is consistently declining in rural areas. Rapid growth of the urban population in recent years as a result of rural-to-urban migration is considered one of the major explanations for such urban/rural diminishing differentials in child mortality in Bangladesh.

This study identifies two distinct child mortality regimes in urban Bangladesh, one for natives and the other for migrants. The analysis also reveals that rural-to-urban migration promotes child survival, since the long-time migrants have experienced lower child mortality than recent migrants and rural natives. In addition, the migrant-native mortality differentials correspond fairly well with the differences in socio-economic status. Urban natives are socio-economically better off than rural-to-urban migrants.

The study also reveals that, even though female rural-to-urban migrants in Bangladesh may improve their standard of living substantially compared with women who remain in rural areas, migrants generally do not attain the standard of living enjoyed by urban natives regardless of duration of stay in urban areas.

Poor and non-poor child mortality differentials are higher in urban areas than in rural areas. Within urban areas, child survival is worse among the migrant poor, especially recent migrants, than the average urban poor. The results confirm that the urban poor are more disadvantaged in terms of child survival than the urban non-poor. The analysis of under-five mortality rates by wealth indicates that children from poor families are more likely to die than children from better-off families. The poorest population in urban areas have similar or higher child mortality than in rural areas. However, the richest have substantially lower mortality in urban areas than in rural areas. Within the urban areas, rural-to-urban migrants have higher child mortality than the average urban population irrespective of wealth quintiles.

The study demonstrates that housing conditions, such as household construction materials and access to safe drinking water and hygienic toilet facilities, are the most critical determinants of child survival in urban areas, even after controlling for migration status. This indicates that, by simply improving the water and sanitation conditions of the household, child survival status can be substantially improved, rather than by attempting to increase the assets and income of the households.

The study underscores the importance of the mother's education, especially beyond secondary levels, to child survival in urban areas. Mother's parity, household size, mother's autonomy (measured by household headship), household economic status, mother's age at the time of birth, and preceding birth interval have significant differential effects on child survival in urban areas. The analysis reveals that maternal and household factors partly explain infant and child survival patterns in urban Bangladesh. This, however, does not imply that the effects of migration on child survival have diminished, but rather are mostly accentuated after controlling for maternal and household factors.

The underlying efforts to improve child health in urban Bangladesh should, thus, focus on the urban poor, particularly the urban migrants whose numbers are growing more rapidly than those of the rural poor as a result of heavy rural-to-urban migration. Urban planners should be concerned about the rapidly expanding cities and the concentration of migrants in urban areas. The study

results highlight the need to target migrant groups and the urban poor within urban areas in the provision of health-care services. Further research is needed to understand the health-care needs of migrants in urban areas for planning purposes and in order to develop appropriate health policy.

Bangladesh has one of the most vulnerable economies in the world, characterized by an extremely high population density, low resource base, high incidence of natural disasters and extremely adverse initial circumstances associated with the inheritance of a war-ravaged economy. These have adverse implications for long-term savings, investment and growth. Such defining features prove a challenge to the development of a framework to achieve the MDGs, which if attained would provide a much improved country by 2015: extreme poverty would be cut in half, all children would have access to primary school and infant, child and maternal mortality would be greatly reduced. Notwithstand-

ing the early negative predictions, Bangladesh has achieved considerable success in several spheres such as population control, reductions in child mortality and child malnutrition, reductions in maternal mortality, disaster mitigation, mainstreaming women into the development process, catalysing grass-roots activism through non-governmental organizations and community-based organizations, and in making the democratic transition.

Growth performance and income-poverty reduction have also improved in the decade of the 1990s compared with previous decades, though much remains to be done in these areas. These signs of improvement indicate that development is possible even in the most trying of circumstances. Bangladesh, which was once termed “the test case of development”, may indeed represent a learning site for keeping hope alive for other equally less fortunate post-colonial countries with adverse socio-economic conditions.

References

- Abu-Lughod, J. (1961). "Migrant adjustment to city life: The Egyptian case", *American Journal of Sociology*, vol. 67, pp. 22-32.
- Afsar, R. (2000). *Rural-Urban Migration in Bangladesh: Causes, Consequences and Challenges* (Dhaka, University Press Limited).
- Behm, H. and J. Vallin (1982). "Mortality differentials among human groups", in S.H. Preston, ed., *Biological and Social Aspects of Mortality and the Length of Life* (Liege, Ordina Editions), pp. 11-37.
- Bender, D.E., T. Rivera and D. Madonna (1993). "Rural origin as a risk factor for maternal and child health in peri-urban Bolivia", *Social Science and Medicine*, vol. 37, No.11, pp. 1345-1349.
- Brockerhoff, M. (1990). "Rural-to-urban migration and child survival in Senegal", *Demography*, vol. 27, No. 4, pp. 601-615.
- Brockerhoff, M. (1995). "Child survival in big cities: The disadvantage of migrants", *Social Science and Medicine*, vol. 40, No. 10, pp.1371-1383.
- Bangladesh Bureau of Statistics (BBS) (2003). *Bangladesh Population Census 2001* (Dhaka, Ministry of Planning) and *Demography*, vol. 27, No. 4, pp. 601-615.
- Casterline, J.B., E.C. Cooksey and A.F.E. Ismail (1989). "Household income and child survival in Egypt", *Demography*, vol. 26, No. 1, pp. 15-26.
- Centre for Urban Studies (1990). *The Urban Poor in Bangladesh, Vol. 1: Comprehensive Summary Report* (Dhaka, Centre for Urban Studies, Dhaka University).
- Cox, D.R. (1972). "Regression models and life tables", *Journal of Royal Statistical Society*, vol. 34, pp. 187.
- Desai, S. (1992). "Children at risk: The role of family structure in Latin America and West Africa", *Population and Development Review*, vol. 18, No. 4, pp. 689-717.
- Davis, K. (1973). "Cities and mortality", in *International Population Conference Liege 1973, Vol. 3*. International Union for the Scientific Study of Population, Liege, pp. 259-282.
- DaVanzo, J. (1988). "Infant mortality and socioeconomic development: Evidence from Malaysian household data", *Demography*, vol. 25, No. 4, pp. 581-595.
- Farah, A.-A. and S.H. Preston (1982). "Child mortality differentials in the Sudan", *Population and Development Review*, vol. 8, No. 2, pp. 365-384.
- Filmer, D. and L. Pritchett (1999). "The effect of household wealth on educational attainment: Evidence from 35 countries", *Population and Development Review*, vol. 25, No.1, pp. 85-120.
- Haaga, J.G. (1989). "Mechanisms for the association of maternal age, parity, and birth spacing with infant health", in A.M Parnell, ed., *Contraceptive Use and Controlled Fertility: Health Issues for Women and Children* (Washington DC, National Academy Press), pp. 96-139.
- Harpham, T. and C. Stephens (1991). "Urbanization and health in developing countries", *World Health Statistics Quarterly*, vol. 44, No. 2, pp. 62-69.
- Hobcraft, J. (1991). "Child spacing and child mortality", in *Demographic and Health Surveys World Conference, Vol. II* (Columbia, Maryland, IRD/Macro International).
- Hobcraft, J. N., J.W. McDonald and S.O. Rutstein (1984). "Socio-economic factors in infant and child mortality: A cross-national comparison", *Population Studies*, vol. 38, No. 2, pp.193-224.

- Khan, A.U. (1997). "Delivery of health care services to the urban poor", in N. Islam and others, eds., *Addressing the Urban Poverty Agenda in Bangladesh: Critical Issues and 1995 Survey Results* (Dhaka, University Press Limited).
- Lloyd, C.B. and A. J. Gage-Brandon (1993). "Women's role in maintaining households: Family welfare and sexual inequality in Ghana", *Population Studies*, vol. 47, No.1, pp. 115-131.
- McGee, T.G. (1967). *The Southeast Asian City* (New York, Praeger).
- Miller, J.E., J. Trussell, A.R. Pebley and B. Vaughan (1992). "Birth spacing and child survival in Bangladesh and Phillipines", *Demography*, vol. 29, No. 2, pp. 305-318.
- Mitra, S.N., Ahmed Al-Sabir, T. Shaha, S. Kumar (2001). *Bangladesh Demographic and Health Survey 1999-2000* (Dhaka, Bangladesh, NIPOORT and Mitra and Associates).
- Mojumdar, P., S. Mahmud and R. Afsar (1989). *Squatter Life in the Agargaon Area* (Dhaka, Bangladesh Institute of Development Studies), mimeo.
- Mosley, W.H. and S. Becker (1991). "Demographic models for child survival and implications for health intervention program", *Health Policy and Planning*, vol. 6, No. 3, pp. 218-233.
- Pebley A.R., and S. Millman (1986). "Birth spacing and child survival", *International Family Planning Perspectives*, vol. 12, No. 3, pp. 71-79.
- Ssengonzi, R., G.F. De Jong and C. Shannon Stokes (2002). "The effect of female migration on infant and child survival in Uganda", *Population Research and Policy Review*, vol. 21, No. 5, pp. 403-431.
- Tam, L. (1994). "Rural-to-urban migration in Bolivia and Peru: Association with child mortality, breastfeeding cessation, maternal care and contraception", *DHS Working Papers*, vol. 8, pp. 1-36.
- Timaeus, I.M and L. Lush (1995). "Intra-urban differentials in child health", *Health Transition Review*, vol. 5, No. 2, pp.163-90.
- Trussell J and C. Hammerslough (1983). "A hazards-model analysis of the covariates of infant and child mortality in Sri Lanka", *Demography*, vol. 20, No.1, pp.1-26.
- United Nations (1993a). *World Urbanization Prospects: The 1992 Revision* (United Nations publication, Sales No. E.92.XIII.11).
- United Nations (1993b). *World Urbanization Prospects: The 1992 Revision. Estimates and Projections of Urban and Rural Populations and of Urban Agglomerations*, Department of Economic and Social Information and Policy Analysis, United Nations publication, Sales No. E.02.XIII.16.
- World Bank (1999). *Toward an Urban Strategy for Bangladesh*, Report No. 20289, Bangladesh.
- World Health Organization (WHO) (1991). "Urbanization and health in developing countries: A challenge for health for all", *World Health Statistics Quarterly*, vol. 44, No. 4. pp.185-244.
- Wagstaff, A. and N. Watanabe (2002). *What Difference Does the Choice of SES Make in Health Inequality Measurement?* Technical Note (Washington DC, World Bank).
- Zulkifli, S.N., U. Maw Khin, K. Yusof and W.Y. Lin (1994). "Maternal and child health in urban Sabah, Malaysia: A comparison of citizens and migrants", *Asia Pacific Journal of Public Health*, vol. 7, No. 3, pp.151-158.

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Chapter V

Maternal and Adult Mortality in Sri Lanka

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In the South Asian context, Sri Lanka's experience in the decline of mortality during the past century has been unique. The mortality levels in Sri Lanka remained high until the beginning of the second decade of the last century. The crude death rate fluctuated around 28 per 1,000 population until about 1920. The death rate would have been much higher if not for the considerable under-registration of deaths. The high mortality that prevailed at that time was due to epidemics, endemic diseases, inadequate preventive and curative health-care services, low standard of living and high level of illiteracy among the mass of the population. At the beginning of the century, life expectancy at birth was estimated to be about 37 years (Sarkar, 1957). During the early period, there were two epidemics, the malaria epidemic of 1911 and the influenza epidemic of 1919 when the adult death rate increased sharply (ESCAP, 1976). The annual fluctuations of mortality were less frequent since 1921 except for 1935 when the country experienced its worst malaria epidemic with about 205,000 deaths. It also affected pregnant mothers, with the maternal mortality ratio increasing to a peak level of 2,650 per 100,000 live births. However, the period from 1921 to 1945 is considered a phase of gradual mortality decline. The slow but definite decline in mortality is attributed to factors such as improvements in medical and public health services, environmental sanitation, the provision of educational facilities targeted at the adult population, the construction of roads and railways, and the restoration of irrigation works, which facilitated the production and distribution of food.

The period 1946 to 1950 can be considered one of rapid mortality decline in Sri Lanka. The crude death rate declined by more than a third from an average of 20.7 per 1,000 population in the period 1943-1946 to an average of 13.0 in the period 1947-1950. The highest fall in the absolute number of deaths and in the death rate during a single year took place between 1946 and 1947 when the crude death rate fell from 19.8 per 1,000 to 14.0. This spectacular decline in mortality coincided with an island-wide intensive DDT spraying campaign against malaria, which was then the chief cause of mortality and morbidity in the country.

Further reductions in mortality that followed the rapid decline in the period 1946-1947 may be attributed to the effective use of chemotherapeutic drugs and antibiotics in medical treatment, immunization against communicable diseases and further improvements in medical and health-care facilities. Considerable improvements in maternal and child health care led to the reversal of higher mortality among females, particularly in the reproductive ages. In addition, socio-economic factors, such as improved production and distribution of food, improvements in environmental sanitation and educational attainment, and general living standards, have also contributed in bringing down the death rate further and increasing the life expectancy of the population. The life expectancy at birth, which was 43.9 years for males and 41.6 years for females in 1946, increased to 70.7 and 75.9 years respectively in 1995 (table 1).

I. TRENDS IN ADULT MORTALITY

The trends in adult mortality in Sri Lanka will be examined in the following broad age categories: 5-14, 15-24, 25-44 and 45-64 years during the period from 1920 to 1995.

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Table 1. Expectation of life at birth, by sex, 1900-1995

	1900-1902	1945-1947	1962-1964	1970-1972	1980-1982	1995
Male	37.0	46.8	63.3	64.0	67.7	70.7
Female	37.6	44.7	63.7	66.8	72.1	75.9

Sources: N.K. Sarkar (1957). *The Demography of Ceylon* (Colombo, Sri Lanka: Government Press, Ceylon); Department of Census and Statistics (2003). Sri Lanka Demographic and Health Survey 2000 (Colombo, Sri Lanka: DCS); and Population Division, Ministry of Health.

A. Ages 5-14 years

It is evident from tables 2a and 2b that the age-specific death rates have declined continuously during the period from 1920 to 1996. It should be noted that the declines have been faster during the period 1920 to 1954, which coincides with the period of rapid mortality decline (1946 to 1950). The pace of mortality decline increased again during the period 1970 to 1996. It was also found that the rate of mortality decline has been faster for females.

Table 2a. Age-specific mortality rates, by sex, 5-14 years, 1920-1922 to 1994-1996

Period	Age group			
	5-9		10-14	
	Male	Female	Male	Female
1920-1922	15.1	16.8	9.5	10.6
1945-1947	4.3	5.5	4.2	5.2
1952-1954	3.1	3.7	1.4	1.4
1962-1964	2.0	2.3	1.2	1.1
1970-1972	1.7	1.8	1.1	1.0
1980-1982	1.0	1.0	0.9	0.7
1994-1996	0.6	0.5	0.6	0.5

Sources: Mortality rates for 1920-1922 and 1945-1947 are from ESCAP (1976). *Population of Sri Lanka*, Country Monograph Series No. 4 (Bangkok: ESCAP); rates for 1952-1954, 1962-1964 and 1970-1972 are from T. Nadarajah (1983). "The transition from higher female to higher male mortality in Sri Lanka", *Population and Development Review*, 9(2); and rates for 1980-1982 and 1997 have been computed from data from the Registrar General's Department.

Table 2b. Average annual percentage decline

Period	Age group			
	5-9		10-14	
	Male	Female	Male	Female
1920-1922 to 1945-1947	5.1	4.6	3.3	2.9
1945-1947 to 1952-1954	4.8	5.8	17.0	21.0
1952-1954 to 1962-1964	4.5	4.8	1.6	2.4
1962-1964 to 1970-1972	2.0	3.0	1.1	1.2
1970-1972 to 1980-1982	5.5	6.0	2.1	3.6
1980-1982 to 1994-1996	3.7	5.0	3.0	2.5

Note: The rates have been computed from the above data.

B. Ages 15-24 years

The age-specific death rates of the youth population aged 15-24 years showed a rapid decline during the period from 1945 to 1954 and a much slower decline in the subsequent periods (tables 3a and 3b). However, the male mortality rates in-

Table 3a. Age-specific death rates, by sex, 15-24 years, 1920-1922 to 1994-1996

Period	Age group			
	15-19		20-24	
	Male	Female	Male	Female
1920-1922	9.3	10.5	10.4	14.7
1945-1947	4.9	6.6	5.5	9.0
1952-1954	1.6	2.2	2.2	3.7
1962-1964	1.6	1.6	1.9	2.6
1970-1972	1.5	1.4	2.3	1.9
1980-1982	1.5	1.4	2.5	1.7
1994-1996	2.0	1.0	4.5	1.2

Sources: Mortality rates for 1920-1922 and 1945-1947 are from ESCAP (1976). *Population of Sri Lanka*, Country Monograph Series No. 4 (Bangkok: ESCAP); rates for 1952-1954, 1962-1964 and 1970-1972 are from T. Nadarajah (1983). "The transition from higher female to higher male mortality in Sri Lanka", *Population and Development Review*, 9(2); and rates for 1980-1982 and 1997 have been computed from data from the Registrar General's Department.

Table 3b. Average annual percentage rates of decline

Period	Age			
	15-19		20-24	
	Male	Female	Male	Female
1920-1922 to 1945-1947	2.6	1.9	2.6	2.0
1945-1947 to 1952-1954	17.0	17.0	14.0	14.0
1952-1954 to 1962-1964	–	3.3	1.5	3.6
1962-1964 to 1970-1972	0.8	1.7	+2.4	4.0
1970-1972 to 1980-1982	–	–	+0.8	1.1
1980-1982 to 1994-1996	+2.1	2.4	+4.3	2.5

Note: The rates have been computed from table 3a.

creased since 1962, particularly in the age group 20-24 years. This could be mainly attributed to the rise in suicide deaths in Sri Lanka among the young. It can also be seen from table 4 that the mortality rate related to suicides of males aged 15-24 years has increased over time relative to those of all ages. A similar pattern is also seen for females, but to a lesser magnitude.

Table 4. Mortality due to suicide among those aged 15-24 years and all ages, by sex, 1971-1995

Year	(per 100,000)			
	Male	Female	Total	All ages
1971	40.8	28.2	34.6	18.2
1981	74.4	60.7	67.6	29.7
1995	52.7	40.3	46.6	30.4

Source: Computed from data of the Registrar General's Department.

C. Ages 25-44 years

Among those from 25 to 44 years, mortality rates have shown a continuous decline up to 1964 and a slight increase in the following years, especially for men (table 5a and 5b). As in the case of previous age segments, the period 1945 to 1954 shows the highest rates of mortality decline. It is also interesting to note that until the period 1962-1964, female mortality rates were higher than that of males. However, since then female mortality rates have declined at a faster rate and registered lower rates than male mortality. The faster mortality decline for females is also reflected in life expectancy at birth (table 1). This decline in the female mortality rate is partly attributed to the decline in the maternal mortality ratio. It has been estimated that of the total reduc-

Table 5a. Age-specific death rates, by sex, 25-44 years, 1920-1996

Period	Age group							
	25-29		30-34		35-39		40-44	
	Male	Female	Male	Female	Male	Female	Male	Female
1920-1922	12.0	17.2	12.9	4.0	1.2	4.3	20.5	20.4
1945-1947	6.4	10.6	7.8	19.3	16.9	19.8	11.8	11.9
1952-1954	2.5	4.5	2.9	11.7	9.4	11.6	4.8	5.3
1962-1964	2.3	3.1	2.4	4.9	3.9	5.4	4.4	4.2
1970-1972	2.4	2.3	2.6	3.3	3.5	4.1	5.2	3.4
1980-1982	2.4	1.5	2.4	2.5	4.0	3.3	4.4	2.4
1994-1996	4.4	1.2	4.0	1.6	3.4	2.1	4.9	1.6

Sources: Mortality rates for 1920-1922 and 1945-1947 are from ESCAP (1976). *Population of Sri Lanka*, Country Monograph Series No. 4 (Bangkok: ESCAP); rates for 1952-1954, 1962-1964 and 1970-1972 are from T. Nadarajah (1983). "The transition from higher female to higher male mortality in Sri Lanka", *Population and Development Review*, 9(2); and rates for 1980-1982 and 1997 have been computed from data from the Registrar General's Department.

Table 5b. Average annual percentage decline

Period	Age group							
	25-29		30-34		35-39		40-44	
	Male	Female	Male	Female	Male	Female	Male	Female
1920-1922 to 1945-1947	2.5	2.0	2.0	2.0	2.4	2.2	2.2	2.2
1945-1947 to 1952-1954	14.0	13.0	15.0	14.0	13.0	11.0	14.0	8.0
1952-1954 to 1962-1964	0.8	3.8	1.9	4.0	1.1	1.6	0.9	2.3
1962-1964 to 1970-1972	+0.6	3.7	-1.0	3.5	+1.7	2.7	+2.1	2.7
1970-1972 to 1980-1982	-	4.3	0.8	2.9	1.6	4.7	1.7	3.6
1980-1982 to 1994-1996	+4.4	2.2	+1.6	2.1	+1.7	3.0	+0.8	3.0

Note: The rates have been computed from table 5a.

tion in the death rates of females aged 15-44 years from the period 1952-1954 to 1970-1972, about 40 per cent is attributed to the reduction in maternal deaths. This proportion may be even higher as the reduction in the maternal mortality ratio may have also contributed to a reduction in the deaths indirectly caused by pregnancy and childbirth (Nadarajah, 1983). In another study on mortality in Asian and Pacific countries, Lopez (2003) found that male mortality is higher than that of females in the middle age group, with Sri Lanka having the largest difference; male deaths were recorded to be 2.2 times higher than that of female death rates.

D. Ages 45-64 years

It is evident from tables 6a and 6b that the pace of decline in male mortality of those aged 45-64 years has slowed considerably since the early 1950s. In fact in certain periods, the mortality rate has increased. This is clearly evident in the period 1962-1964 to 1970-1972 when male mortality increased while female mortality continued to decline. It is also clear that the female mortality rate since the early 1960s has declined at a faster rate than that of males. The slowing of the male mortality decline is partly due to the increase in mortality caused by degenerative diseases.

Table 6a. Age-specific death rates, by sex, 45-64 years, 1920-1996

Period	Age group							
	45-49		50-54		55-59		60-64	
	Male	Female	Male	Female	Male	Female	Male	Female
1920-1922	25.6	21.1	31.7	25.3	37.6	36.8	47.5	54.5
1945-1947	15.4	13.0	19.8	15.7	25.0	21.5	34.2	31.5
1952-1954	6.8	6.4	9.4	8.4	14.6	12.3	21.5	18.3
1962-1964	6.7	5.7	9.0	7.1	13.9	11.5	19.5	16.6
1970-1972	7.6	4.7	10.4	6.3	15.3	9.9	21.3	15.3
1980-1982	6.9	3.8	9.5	5.0	14.0	8.0	19.4	12.1
1994-1996	7.3	2.8	10.1	4.4	13.7	6.1	19.7	10.4

Sources: Mortality rates for 1920-1922 and 1945-1947 are from ESCAP (1976). *Population of Sri Lanka*, Country Monograph Series No. 4 (Bangkok: ESCAP); rates for 1952-1954, 1962-1964 and 1970-1972 are from T. Nadarajah (1983). "The transition from higher female to higher male mortality in Sri Lanka", *Population and Development Review*, 9(2); and rates for 1980-1982 and 1997 have been computed from data from the Registrar General's Department.

Table 6b. Average annual percentage decline

Period	Age group							
	45-49		50-54		55-59		60-64	
	Male	Female	Male	Female	Male	Female	Male	Female
1920-1922 to 1945-1947	2.1	2.0	1.9	1.9	1.7	2.2	1.3	2.2
1945-1947 to 1952-1954	12.0	11.0	11.0	9.0	8.0	8.0	7.0	8.0
1952-1954 to 1962-1964	0.2	1.2	0.5	1.7	0.5	0.7	1.0	1.0
1962-1964 to 1970-1972	+1.6	2.2	+1.8	1.6	+1.2	1.9	+1.1	1.0
1970-1972 to 1980-1982	1.0	2.2	0.9	2.3	0.9	2.2	0.9	2.4
1980-1982 to 1994-1996	+0.4	2.2	+0.4	1.1	0.2	1.9	0.1	1.2

Note: The rates have been computed from table 6a.

II. DETERMINANTS OF ADULT MORTALITY

In the age group 5-14 years during the early 1970s, convulsions, accidents and pneumonia accounted for a considerable proportion of mortality. However, by 1995, deaths as a result of these causes were considerably reduced (table 7). It is also evident that during the period 1981 to 1995, there was a significant reduction in deaths as a result of infection and parasitic diseases. Accidents continued to remain the major killer in this age group. In the youth age group 15-24 years, convulsions, accidents and suicides showed relatively high death rates in 1971. Although the death rate as a result of convulsions declined considerably by 1995, death rates as a result of accidents and suicides, in fact, had increased. It is also seen that, as in the case of those aged 5-14 years, males have higher death rates as a result of accidents (table 8). On the contrary,

females show consistently higher death rates as a result of anaemia. The rising trend in the death rate among the youth as a result of accidents and suicides is a cause for concern. Among those from 25 to 44 years, generally when mortality rates are low, death rates from diseases of the circulatory system show high levels between 1981 and 1995 (table 9). The death rates from suicides show an upward trend, with male rates being three times higher than that of females. In the age group 45 to 64 years, when degenerative diseases begin to surface, hypertensive diseases, ischaemic heart disease, chronic liver diseases, cerebrovascular diseases and diabetes show relatively high mortality rates (table 10). The death rate from ischemic heart disease showed an increase from 1971 to 1995. Death rates from bronchitis and asthma, and infection and parasitic diseases, although showing declines, continued to remain major causes of death among the population of older persons.

Table 7. Cause-specific death rate, by sex and age 5-14 years, 1971 to 1995

(per 100,000)

Cause	1971		1981		1995	
	Male	Female	Male	Female	Male	Female
1. Pneumonia	10.3	12.2	4.1	4.6	1.8	1.9
2. Bronchitis, emphysema, asthma	2.2	2.9	2.2	2.8	1.1	1.2
3. Infections and parasitic diseases	—	—	16.7	13.2	5.1	5.5
4. Intestinal infectious diseases	2.5	1.4	7.0	5.2	1.3	1.9
5. Diseases of the circulatory system	—	—	6.1	4.8	6.2	3.4
6. Convulsions	19.1	22.0	3.8	3.9	0.9	0.7
7. Accidents	22.0	18.8	22.0	14.1	19.3	11.1

Source: Computed from data of the Registrar General's Department.

Table 8. Cause-specific death rate, by sex and age 15-24 years, 1971 to 1995

(per 100,000)

Cause	1971		1981		1995	
	Male	Female	Male	Female	Male	Female
1. Tuberculosis	3.3	3.2	2.3	3.7	0.3	0.7
2. Pneumonia	5.7	6.2	4.1	5.3	1.8	1.9
3. Bronchitis, emphysema, asthma	1.6	2.8	2.0	2.3	1.6	1.5
4. Infection and parasitic diseases	—	—	12.5	14.8	4.7	5.8
5. Diseases of the circulatory system	—	—	16.3	18.5	8.5	8.2
6. Anaemia	4.1	10.8	12.5	2.5	0.6	1.1
7. Convulsions	13.3	13.5	0.9	0.9	0.2	0.2
8. Accidents	37.5	19.0	43.8	26.1	49.4	14.4
9. Suicides	40.7	28.2	74.4	81.8	52.7	40.3

Source: Computed from data of the Registrar General's Department.

Table 9. Cause-specific death rate, by sex and age 25-44 years, 1971 to 1995

(per 100,000)

Cause	1971		1981		1995	
	Male	Female	Male	Female	Male	Female
1. Tuberculosis	13.7	13.3	9.3	5.6	4.5	2.3
2. Pneumonia	10.5	12.3	6.1	6.4	5.2	2.8
3. Bronchitis, emphysema, asthma	4.9	8.0	3.7	5.9	3.4	5.1
4. Infection and parasitic diseases	—	—	24.0	17.1	14.2	8.7
5. Intestinal infectious diseases	23.9	2.9	9.0	3.0	11.2	4.3
6. Diabetes mellitus	5.1	2.9	3.1	2.6	2.8	1.8
7. Anaemia	8.2	26.9	4.1	4.7	1.2	2.1
8. Hypertensive diseases	2.9	2.4	3.0	2.3	2.5	2.2
9. Ischaemic heart diseases	23.9	2.9	9.0	3.0	11.2	4.3
10. Chronic liver disease and cirrhosis	6.9	2.5	4.0	2.6	6.4	2.5
11. Cerebrovascular diseases	7.3	5.8	5.0	3.4	5.5	2.8
12. Diseases of the circulatory system	—	—	56.4	38.1	50.2	23.6
13. Accidents	47.0	18.2	67.1	19.5	75.6	15.1
14. Suicides	36.7	12.2	47.0	18.5	63.2	19.6

Source: Computed from data of the Registrar General's Department.

Table 10. Cause-specific death rate, by sex and age 45-64 years, 1971 to 1995

(per 100,000)

Cause	1971		1981		1995	
	Male	Female	Male	Female	Male	Female
1. Tuberculosis	50.0	25.0	35.9	20.1	21.3	5.6
2. Pneumonia	34.7	31.3	20.5	16.3	19.1	8.6
3. Bronchitis, emphysema, asthma	31.0	33.1	30.1	30.6	40.2	25.7
4. Infection and parasitic diseases	—	—	84.6	49.3	48.8	21.1
5. Diabetes mellitus	35.2	25.8	23.7	20.6	21.6	15.9
6. Anaemia	42.0	48.9	19.7	19.7	6.3	6.6
7. Hypertensive diseases	35.0	19.4	31.4	20.9	34.3	18.8
8. Ischaemic heart diseases	21.5	27.6	76.0	23.8	90.6	30.1
9. Chronic liver diseases and cirrhosis	32.9	33.1	30.1	30.6	40.2	25.7
10. Cerebrovascular diseases	55.4	28.8	36.5	23.3	45.8	22.8
11. Accidents	66.7	21.3	83.7	25.5	103.9	20.7
12. Suicides	36.6	8.3	46.3	11.6	56.7	9.2

Source: Computed from data of the Registrar General's Department.

III. TRENDS IN MATERNAL MORTALITY

As in the case of general mortality levels, the maternal mortality ratio in Sri Lanka remained high prior to 1946. A definite downward trend was observed since 1947 when the maternal mortality ratio declined from 1,060 per 100,000 live births to 410 by 1955 and to 25 by 1995 (table 11). Between 1940 and 1946, a period of six years, the maternal mortality ratio declined by 60 points. However, in the years 1946-1947, it decreased by 490 points and in the subsequent three years by another 500 points. The proportion of maternal deaths to female deaths in the age group 15-49 years has shown a steady decline. In 1950, maternal deaths constituted 19 per cent of all deaths and by 1996 they had dropped to 1.2 per cent. While during the early periods the geographic differences in maternal mortality were significant, by 1980 the district rates had narrowed to a considerable extent. It can be seen from table 12 that the age-specific maternal mortality rate declined in all age groups during the period 1954-1981 and the pace of decline has been fairly uniform.

The Registrar General's Department is responsible for the registration of vital events such as births, deaths and marriages. The mortality data reported includes maternal deaths. A survey conducted in 1981 by the Department of Census and

Table 12. Age-specific maternal mortality ratios, 1954-1981

(per 1,000)

<i>Age of mother</i>	<i>1954</i>	<i>1962</i>	<i>1972</i>	<i>1981</i>	<i>Percentage decline 1954-1981</i>
< 20	4.7	3.1	0.5	0.4	91.5
20-24	3.6	2.3	1.2	0.4	88.9
25-29	3.7	2.6	1.3	0.4	89.1
30-34	5.0	2.9	1.3	0.5	90.0
35-39	7.7	4.7	2.1	1.0	87.0
40-44	9.5	4.8	3.6	1.2	87.4

Source: Registrar General's Department.

Statistics revealed a 94 per cent completeness of death registration in the country. However, only 10 per cent of deaths were reported by medical registrars. Thus, errors with regard to reporting the cause of death can be considerable. A comprehensive study undertaken by the College of Obstetricians and Gynaecologists in 1996 indicated that 312 maternal deaths had occurred in 1996, which was nearly four times the figure reported by the civil registration system for that year. The number reported by the maternal death review undertaken by the Family Health Bureau of the Ministry of Health also fell short by 33 per cent. The maternal death reviews undertaken by the Family Health Bureau since the early 1980s have, however, considerably improved the quality of data on maternal deaths reported directly by institutions (medical institutions and health units). The data included all maternal deaths concerned that occurred in hospitals and the community. The maternal deaths reported by the Maternal Mortality Review exceed the data reported by the civil registration system by a considerable margin (Vidyasagara, 2003). The maternal mortality ratios computed on the basis of maternal review are presented in table 13. The ratios show an increase from 1995 to 1998, thereafter recording a decline.

Both health-care services and non-health factors have contributed to the decline in maternal mortality in Sri Lanka (Abeykoon, 1988). Sri Lanka has a long tradition of antenatal care services in the form of maternal and child health (MCH) clinics and hospitals. Pregnant women are identified by the field public health midwife and referred to the

Table 11. Maternal mortality ratio, 1940-1995

(per 100,000)

<i>Year</i>	<i>Rate</i>	<i>Percentage decline</i>
1940	1,610	—
1946	1,550	3.7
1947	1,060	31.6
1950	560	47.2
1955	410	26.8
1960	300	26.8
1965	240	20.0
1970	120	50.0
1975	100	16.7
1980	60	40.0
1985	50	16.7
1990	30	40.0
1995	25	16.7

Source: Registrar General's Department.

Table 13. Maternal mortality ratios based on the Maternal Mortality Review, 1995-2001

(per 100,000)

Year	Ratio	Percentage change
1995	46.1	—
1996	60.9	+32.1
1997	61.2	+0.5
1998	73.5	+20.1
1999	60.6	-17.6
2000	55.3	-8.7
2001	47.2	-14.6

Source: Computed from data of the Family Health Bureau.

respective MCH field clinic. Early identification provides adequate time for advising the mother on care during pregnancy. The nutritional requirements, importance of rest during the last trimester, place of delivery and future family planning are discussed during home visits. It can be seen from table 14 that the percentage of mothers visiting clinics for prenatal care is very high at 94.5 per cent. Similarly, a high proportion of coverage in home visits by family health workers is seen. It is also of importance to note that there is hardly any variation by birth order with regard to prenatal care. It is also seen that as a result of a high percentage of visits to clinics by pregnant mothers, the percentage of mothers who have undergone medical check-ups is also very high except for VDRL (Venereal Disease Research Laboratories) examinations, as this facility is not available at all clinics (table 15).

Table 14. Type of prenatal care received by mother during last birth, by birth order, 2000

(per cent)

Birth order	Family health worker visited home	Mother visited clinic	Family health worker visits + clinic visits	No care
1	84.6	94.5	84.1	0.3
2-3	83.7	94.1	83.4	0.3
4-5	82.9	96.5	82.9	0.5
6+	83.7	95.3	81.4	0.0
Total	84.0	94.5	83.7	0.3

Source: Department of Census and Statistics (2003). *Sri Lanka Demographic and Health Survey 2000* (Colombo, Sri Lanka: DCS).

Table 15. Percentage of mothers who sought a medical check-up during last pregnancy, by type of care and birth order, 2000

Type of care	Birth order				
	1	2-3	4-5	6+	Total
1. Measurement of:					
Height	98.2	96.0	96.0	100.0	97.0
Weight	99.5	98.3	99.0	100.0	98.9
2. Urine test	99.4	98.3	98.5	100.0	98.9
3. Blood test:					
Blood group	97.0	89.9	87.9	88.4	92.8
VDRL ^a	54.2	44.9	44.7	32.6	48.7
4. Blood pressure	99.2	98.0	98.0	100.0	98.6

Source: Department of Census and Statistics (2003). *Sri Lanka Demographic and Health Survey 2000* (Colombo, Sri Lanka: DCS).

^a Venereal Disease Research Laboratories.

In Sri Lanka, a high percentage of deliveries take place in institutions (97.1 per cent). Only 1.8 per cent of births take place at home. It can be seen from table 16 that 76.7 per cent of institutional births take place in tertiary-level institutions where specialist obstetric care is available.

Table 16. Percentage of births, by type of institution, 2000

Type of institution	Percentage of births
Primary level	3.0
Intermediate level	20.3
Tertiary level	76.7
Total	100

Source: Department of Health Services, *Annual Health Bulletin 2002*, Ministry of Health, Colombo.

Postpartum care including domiciliary care is very important as mothers are often discharged from institutions within one to two days of normal delivery. The coverage of postpartum care in Sri Lanka is not as high as prenatal care. The coverage of postpartum care by the public health midwife, defined as "at least one visit", was about 77 per cent in 2000.

The increase in the number of trained midwives (family health workers) has also contributed to the decline in maternal mortality. The total number of midwives increased from 347 in 1941 to 7,377 in 2001. The basic qualification required to become a midwife is 11 years of schooling. After obtaining 12 months of institutional training in midwifery and basic nursing, the midwife spends six months in a selected field-training area where she applies her knowledge and develops skills in a working situation in the community. On completion of her 18 months of training, she is registered with the Sri Lanka Medical Council. Thus, the traditional birth attendants seen in other South Asian countries are not found in Sri Lanka. Each midwife serves a population of 3,000 to 5,000 people.

Birth spacing by contraceptive use and fertility reduction has also contributed to the reduction of high-risk births in terms of mother's age and parity. The contraceptive prevalence rate has increased from 34.2 per cent in 1975 to 70.0 per cent in 2000 (table 17). It can be seen that the use of modern methods has increased from 20.2 per cent in 1975 to nearly 50 per cent in 2000. As a result, the total fertility rate has declined from 3.4 children in 1974 to 1.9 in 2000. The age-specific fertility rates in the high-risk age groups have also declined significantly (table 18). Thus, in 1998, the proportion of first and second order births to the total number of births was 76.8 per cent. Similarly, the percentage of "high risk" births (births to mothers under 20 years and over 35 years of age) was only 28.5 per cent during the same year.

Table 17. Contraceptive prevalence rate, 1975-2000

(percentage)

Method	1975	1982	1987	1993	2000
Modern temporary	9.6	9.9	10.8	16.5	26.4
Sterilization	10.6	22.0	29.8	27.2	23.1
Traditional	14.2	26.0	21.1	22.4	20.5
All methods	34.4	57.8	61.7	66.1	70.0

Source: Department of Census and Statistics (2003). *Sri Lanka Demographic and Health Survey 2000* (Colombo, Sri Lanka: DCS).

Table 18. Age-specific fertility rates in selected age groups, 1974 to the period 1995-2000

Age group	1974	1995-2000	Percentage decline
15-19	31	27	12.9
35-39	126	40	68.3
40-44	43	8	81.4
Total fertility rate (children per woman)	3.4	1.9	44.1

Source: Department of Census and Statistics (2003). *Sri Lanka Demographic and Health Survey 2000* (Colombo, Sri Lanka: DCS).

In 1945, education was declared free of cost up to the university level; this remains so even today. The free education policy and the introduction of the Sinhala and Tamil languages in secondary and tertiary education since the late 1950s have contributed to rising educational levels of the population, particularly those of females. The gap between male and female literacy rates, which was 26.3 percentage points in 1946, has narrowed to only about 3 percentage points in 2001. The percentage of females aged 15-49 years who have had education beyond the primary level has also increased significantly during this period.

Food subsidies and food supplementation programmes implemented by the Government since the early 1940s may have also had an impact on maternal mortality. Free rice and subsidized food such as *dhal* (split pulses) and dried fish to the entire population for more than three decades and the distribution of free milk to pregnant women and pre-school children may have improved the nutritional status of pregnant mothers, particularly those in low-income families. The Maternity Benefits Ordinance of 1930 was amended in 1946, 1952, 1978 and 1986 to enhance maternity benefits for mothers (Fernando and others, 2003).

III. CAUSES OF MATERNAL MORTALITY

Maternal deaths can be subdivided into two categories: (a) direct obstetric deaths and (b) indirect obstetric deaths. The direct obstetric deaths are those due to obstetric complications of the pregnant state, while the indirect deaths are those resulting

from previous existing diseases or diseases that develop during pregnancy and which are not due to direct obstetric causes. In the year 2000, 57 per cent of maternal deaths were due to direct obstetric causes. Among the direct obstetric causes, postpartum haemorrhage is the leading cause followed by eclampsia and PIH (pregnancy-induced hypertension) and septic abortions (table 19). Anaemia in pregnant women is reported to be about 65 per cent. Heart and liver diseases are the two major causes of indirect maternal mortality. In recent years, induced abortions have increased in number and, as a result, septic abortions have become one of the leading causes of maternal mortality.

Table 19. Causes of maternal mortality, 1999 and 2001

<i>Causes</i>	<i>1999</i>	<i>2001</i>
1. Haemorrhage (APH ^a , PPH ^b)	20.1	24.5
2. Eclampsia and PIH ^c	12.5	16.2
3. AF ^d /embolism, P/embolism	7.6	12.6
4. Heart disease complicating pregnancy	10.9	9.6
5. Septic abortions	8.7	8.5
6. Liver disease complicating pregnancy	7.1	4.8

Source: Family Health Bureau (2001). *Annual Report on Family Health Sri Lanka*.

^a APH = antepartum haemorrhage

^b PPH = primary or unexplained hypertension

^c PIH = pregnancy-induced hypertension

^d AF = amniotic fluid embolism

The following strategies have been identified to improve further the safe motherhood initiatives: improve the quality of antenatal and postnatal services; establish proper risk assessment and referral; ensure equitable distribution of maternal care services; improve maternal nutrition; prevent and control maternal undernutrition and anaemia in pregnancy; prevent and control malaria in pregnant mothers; reduce maternal deaths from puerperal or post-abortion sepsis; and empower women.

IV. EMERGING ISSUES IN MATERNAL AND ADULT MORTALITY

In recent decades, the rising suicide and induced abortion ratios are emerging issues affecting adult mortality and morbidity in Sri Lanka.

The annual suicide ratio in Sri Lanka increased from 6.9 per 100,000 in 1950 to 47 by 1991, one of the highest ratios recorded in the world. However, it has shown a decline since the mid-1990s. Suicide shows two peaks: in the young age group (15-29 years) and among those above 65 years of age. Recent studies have shown that three factors are associated with suicidal behaviour: depression, alcohol consumption and previous attempts at suicide.

Both community- and hospital-based studies in Sri Lanka show that depression is the primary cause of suicides (Abeyasinghe, De Silva and Kasturiaratchi, 2000; De Silva and others, 2002; Rankapuge and Perera, 2000). Studies have also shown that alcohol is associated with suicidal behaviour in men, as well as in women harassed by men under the influence of alcohol (De Silva, Rankapuge and Perera, 2000). Psychological autopsies have shown that alcoholism is the primary factor related to the cause of death among male suicides (60.8 per cent). As regards previous attempts at suicide, a recent study has shown that three months after being discharged from hospital, about 50 per cent still have the same precipitating problems and 24 per cent were suffering from depression, although only a few would undergo psychiatric treatment (Thalagala, 2000).

Another emerging issue with regard to adult mortality and morbidity is induced abortion. It is a major factor affecting the reproductive and general health of women and their families. Induced abortion is illegal in Sri Lanka except to save the life of the mother. However, the illegal status of abortion has in no way deterred women from resorting to it. An estimated 700 abortions are carried out daily in Sri Lanka. The majority of abortions are done under unhygienic conditions. As a result, septic abortion is the fifth major cause of maternal mortality in Sri Lanka (table 19). Demographic and Health Survey data show that the abortion rate has declined during the period 1993 to 2000. Although the level may be underreported, there is an indication that it has reached its peak and is now on the decline.

The motivation to control fertility among married women in Sri Lanka is very high. In 2000, the total fertility rate was 1.9 children per woman, while the total wanted fertility rate was still lower at 1.8 children. The main reasons given by women

seeking abortions are: the youngest child was too young (27.3 per cent), local or foreign employment (14.6 per cent), poverty (13.2 per cent) and having completed the family size (7 per cent). Although only 2.5 per cent of the clients interviewed stated that they were unmarried, the real figure was estimated to be about 10 per cent (De Silva, Rankapuge and Perera, 2000). Unmet need for contraception and contraceptive method failure are also seen as important factors contributing to increased levels of induced abortion.

V. POLICY OPTIONS AND PROGRAMMATIC MEASURES TO FURTHER REDUCE MATERNAL AND ADULT MORTALITY

In spite of a relatively low per capita income (US\$ 935 in 2003), Sri Lanka has made considerable progress in reducing maternal and adult mortality. Its social development policies, particularly in health and education, have no doubt contributed to its success story. There is, however, no room for complacency as further reductions in maternal and adult mortality are possible.

Two major areas of concern are the high suicide rates of young people and the relatively high induced abortion ratios. As regards suicides, recent research suggests that two areas need focused attention: the socio-cultural factors related to suicides and the mental health aspects. Community studies have shown that suicide has been used as a problem solver. Suicide as a means of conflict resolution needs to be addressed in an effective manner through the use of school-based programmes and the mass media. The “life skills” programmes that are being carried out in schools, if properly implemented, can be an important way of addressing this problem. The mass media also need to be utilized effectively to inform the community of danger signs. People with depressive illnesses

need to be identified through the health-care system. It is necessary, therefore, to develop a referral system for people with psychiatric disorders to receive psychiatric services, and those who are distressed owing to life events to obtain counselling services (De Silva, 2003).

Induced abortions are the result of unwanted pregnancy. Despite the high contraceptive prevalence rate (70 per cent) in 2000, there is an estimated unmet need for contraception of about 8 per cent. Access to family planning information and services needs to be improved for vulnerable groups such as urban slum dwellers, plantation workers, internally displaced persons, export processing zone workers and people living in remote rural areas. As a significant proportion of unwanted pregnancies also occur because of method failure, the promotion of emergency contraception would be one way of addressing these issues.

Given the high motivation to control fertility in Sri Lanka, restrictive legislation may be associated with unsafe abortions, which lead to maternal mortality and morbidity. Thus, liberalizing the abortion law has been seen by women activists, in particular, as a means to achieve social justice.

Eliminating unsafe abortions by preventing unwanted pregnancies through increased access to affordable and relatively good quality contraceptive services would go a long way in further reducing maternal mortality. Another intervention that would have an impact on adult and maternal mortality in the future is the improvement of maternal nutrition. State intervention through health education programmes and supplementary feeding for pregnant mothers of low-income families will no doubt contribute to declines in adult and maternal mortality. In addition, detection and treatment of major diseases that cause maternal and adult mortality would contribute to further reductions of mortality in Sri Lanka.

References

- Abeykoon, A.T.P.L. (1998). "Maternal mortality and morbidity in Sri Lanka", paper presented at the Asia Regional Workshop for Orientation and Project Idea Development, organized by the Partners in Population and Development, 22-25 April, Dhaka, Bangladesh.
- Department of Census and Statistics (2003). *Sri Lanka Demographic and Health Survey 2000* (Colombo, Sri Lanka, DCS).
- De Silva, I., I. Rankapuge and R. Perera (2000). "Induced abortion in Sri Lanka: Who goes to providers for pregnancy termination?" in *Demography of Sri Lanka: Issues and Challenges* (Colombo, Sri Lanka, Department of Demography, University of Colombo).
- De Silva, D., N. Kasturiaratchi and D.R.R. Abeysinghe (2002). *Preventing Suicide, Homicide and Non-fatal Harm in Sri Lanka* (Geneva, World Health Organization).
- ESCAP (1976). *Population of Sri Lanka*, Country Monograph Series No. 4 (Bangkok, ESCAP).
- Fernando, D., A. Jayatilleke and V. Karunaratne (2003). "Pregnancy-reducing maternal deaths and disability in Sri Lanka: National strategies", *British Medical Bulletin*, vol. 67.
- Gunasekera, P.C. and P.S. Wijesinghe (2001). "Reducing abortions is a public health issue", *Ceylon Medical Journal*, vol. 46, No. 2.
- Lopez, Alan (2003). "Mortality and morbidity trends and poverty reduction", in *Fifth Asian and Pacific Population Conference: Selected Papers* (United Nations publication, Sales No. E.03.II.F.27).
- Nadarajah, T. (1983). "The transition from higher female to higher male mortality in Sri Lanka", *Population and Development Review*, vol. 9, No. 2.
- Sarkar, N.K. (1957). *The Demography of Ceylon* (Colombo, Sri Lanka, Government Press, Ceylon).
- Thalagala, N.I. (2000). "Attempted suicides: Antecedents and consequences", thesis submitted for the degree of Doctor of Medicine in Community Medicine, University of Colombo, Sri Lanka.
- Vidyasagara, N.W. (2003). *Maternal Mortality Reduction in Sri Lanka* (Colombo, Sri Lanka, World Health Organization).

Chapter VI

Challenges in Addressing Safe Motherhood Issues in Indonesia

Budi Utomo*

Concern about the health of mothers and children gathered momentum in Indonesia in the 1950s with the establishment of mother-child health clinics throughout the country and the implementation of a traditional birth attendant training programme. Influenced by the 1987 Nairobi Safe Motherhood Initiative and especially because maternal mortality remained high, the Government in 1989 initiated a national workshop to seek intersectoral commitment to improve safe motherhood. The outcome of that workshop was a decision to train and deploy a large number of community midwives to villages. Since then, other measures to foster safe motherhood have been undertaken, including the provision of basic emergency obstetric and neonatal care services at the subdistrict level and comprehensive emergency obstetric and neonatal care services at the district level (Ministry of Health (MOH), 1997a). In addition, communities, providers and related sectors were mobilized to increase the demand of communities for such care and the effective utilization of maternal and child health services (Cholil and others, 1997). The Making Pregnancy Safer Strategic Plan launched in 2000 symbolized the Government's commitment to increase both the supply of and demand for emergency obstetric services (MOH, 2001). Despite these measures, maternal mortality continues to remain high. Current political will, the availability of comprehensive strategies to reduce maternal mortality and the availability of cost-effective technologies for addressing obstetric complications have not yet had

a significant impact on the reduction of maternal mortality. The problem is simply that the safe motherhood policies have not yet been optimally translated into action at the service and community levels.

This paper has been prepared in order to review the safe motherhood situation in Indonesia, including the challenges that need to be addressed. Data have been obtained from various sources including documents, survey and study reports and review papers. The presentation of the study is organized to cover the overall situation and the causes of maternal mortality, safe motherhood policies and programmes, and the challenges in addressing the issues at the policy, service management and community levels.

I. HIGH MATERNAL MORTALITY

Estimates of maternal mortality based on data from the last three Demographic and Health Surveys (DHSs) show a declining trend in maternal mortality ratios from 390 deaths per 100,000 live births during the period 1990-1994 to 334 per 100,000 during the period 1993-1997 and 307 per 100,000 during the period 1998-2002. However, this declining trend is inconclusive because the estimates overlap in their confidence intervals, even at the relaxed level of 67 per cent owing to the high level of sampling errors (Badan Pusat Statistik (BPS) and ORC Macro, 2003, p. 190). Moreover, a recent review of small to large studies undertaken in the past two decades suggests that maternal mortality stagnated at a high level, i.e., between 350 and 450 per 100,000 live births (Soemantri and Setyowati, 2004). Such a high level of maternal mortality means that on average one to

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two Indonesian women die every hour¹ as a result of pregnancy complications during delivery, late referral to hospital services, or poor emergency obstetric care. As a comparison, maternal mortality ratios in developed countries are very low at only 7 to 15 maternal deaths per 100,000 live births (Lettenmaier and others, 1988, p. 2). Thus, the risk of maternal death in Indonesia is 20 to 40 times higher than in developed countries.

For each maternal death, many more women suffer from chronic and sometimes serious maternal morbidity complications (McCarthy and Maine, 1992). Studies have suggested 17 to 70 episodes of serious pregnancy and childbirth-related illnesses for every maternal death (see Goodburn and others, 1995). According to the 1995 Indonesia Household Health Survey, the period prevalence of morbidity was 10 per cent during pregnancy, 14 per cent at delivery and 3.3 per cent during the postpartum period (Setyowati and Utomo, 1999).

Besides being a tragedy for the victim, maternal death also has a devastating effect on the surviving members of her family, especially her children. For every dead mother, two children on average are left motherless (Winikoff and Sullivan, 1987, p. 128). Documentation regarding the fate of motherless children is scanty, but motherless children obviously would receive much less than optimum care and health protection compared with children having living mothers (Soekirman, 1994). Thus, the prevention of maternal deaths would result in better care and better chance of survival for infants.

II. CAUSES OF MATERNAL MORTALITY

The causes of maternal mortality are complex, but they can be categorized as immediate and later causes of maternal death. The most immediate causes of maternal death are obstetric or medical causes, while more distant causes operating at the population level are maternal mortality determinants (Loudon, 1992, p. 43). The more immediate determinants are related to the quality of clinical care standards, while the more distant determinants are related to the standard of living, arguing that con-

centration only on the quality of obstetric care might obscure the underlying causes of maternal mortality, notably, poor maternal health as a result of social deprivation at the community level (Loudon, 1992, p. 44). Thaddeus and Maine (1994) suggested three phases of "delay" as the most pertinent factor contributing to maternal deaths: (a) a delay in the decision to seek modern obstetric care, (b) a delay on arrival at the health-care facility and (c) a delay in receiving adequate obstetric care. The patient's decision to seek care, the availability of transportation, the condition of roads and the capability of the facility to deal promptly with obstetric complications can all be implicated in a maternal death by causing delay. Thus, delay is a concept that unifies a number of seemingly disparate factors such as distance, women's status, distribution of facilities and shortage of hospital or medical supplies.

McCarthy and Maine (1992) and Tinker and Koblinsky (1993) proposed a conceptual framework outlining proximate, intermediate and distant causes of maternal mortality and morbidity. In this framework, healthy women, healthy newborns and maternal or perinatal morbidity and mortality are treated as maternal health outcomes. Factors immediately associated with maternal health outcomes, including pregnancy, development of pregnancy-related complications and the management of pregnancy, delivery and the postpartum period, are termed proximate determinants. These are affected by intermediate determinants, which include access to quality family planning and maternal health care, women's reproductive and health behaviour and women's health and nutritional status. The intermediate determinants, in turn, are influenced by distant determinants, which include women's status, political commitment, socio-economic development and cultural factors. Thus, the framework suggests that programmes to reduce the levels of maternal mortality must operate through sequences aimed at: (a) reducing the likelihood that a woman will become pregnant, (b) reducing the likelihood that a pregnant woman will experience a serious complication of pregnancy or childbirth and (c) improving the outcomes of women with complications.

A. Obstetric causes of maternal mortality

In Indonesia, the major obstetric causes of death are attributable to haemorrhage, infection, eclampsia and obstructed labour during or immedi-

¹ Based on an estimated population of 200 million and crude birth rate of 20 per 1,000 live births.

ately after delivery (Government of Indonesia-UNICEF, 2000). Most of the deaths from these causes are actually preventable. The women die because they, their families and those attending the deliveries fail to recognize, or act promptly and appropriately when the complications of pregnancy arise (Daly and Saadah, 1999).

B. Proximate determinants of maternal mortality

In all pregnancies, there are risks of complications, which arise during childbirth. Pregnancy conditions as proximate determinants affect maternal complications. The risk of maternal complications is more apparent if a mother does not want to have a child, or if a pregnant woman is too young, the birth of her child is too closely spaced, she already has too many children, or she is simply too old.

1. Unwanted pregnancies

Unwanted and mistimed pregnancies continue to occur in Indonesia since many sexually active women who do not want to have a child are not using a contraceptive method. Women with an unwanted pregnancy face a high risk of maternal morbidity and mortality since they tend to neglect the care of their pregnancy or try to abort it. Many unintended pregnancies end in induced abortion, most incidents of which are unsafely performed in places that do not meet the minimum standards of medical hygiene. Of all pregnancies, about 8 per cent are unwanted (Central Bureau of Statistics (CBS) and others, 1998; BPS and ORC Macro, 2003), and 9.6 per cent are mistimed (BPS and ORC Macro, 2003).²

2. Abortion

Abortion is illegal in Indonesia, but legal prohibitions do not deter women from having abortions. A recent survey of service delivery produced a national estimate of 2 million cases of abortion annually, including spontaneous abortion (Center for Health Research University of Indonesia (CHRUI), 2001). The survey also showed that in

urban areas obstetricians, midwives, maternity hospitals and family planning clinics accounted for 73 per cent of the abortions. Traditional birth attendants accounted for 15 per cent of the abortions in cities and also played a dominant role in rural areas. Women with an unwanted pregnancy may attempt to abort their pregnancy using a variety of means, including massage (*jamu*) or they may consult illegal practitioners such as a traditional healer (*dukun*) and midwives and nurse-midwives acting illegally, or even trained doctors and other medical personnel (Utomo and others, 1982, p. 51; CHRUI, 2001). Abortion is not limited to adolescents or unmarried women; it also occurs among married women who do not want more children but do not use contraception, or if they do, experience contraceptive failure. A study in Bali indicated that 71 per cent of women seeking abortion were married (Dewi, 1997, p. 33).

One of the most extreme consequences of unsafe abortion is maternal death, but it represents only the "tip of the iceberg" (Barreto and others, 1992). Complications of unsafe abortion such as sepsis, haemorrhage, genital and abdominal trauma, perforated uterus or poisoning could be fatal if left untreated. In Indonesia, abortion and unwanted pregnancy are complex social issues that involve controversial moral, religious and ethical dimensions. These problems are aggravated by the absence of legal clarity. The existing health law (UU No. 23/1992) is rife with ambiguities and even discourages attempts to promote improvements in the quality of reproductive health care.

3. Early marriage and early pregnancy

Early or teenage marriage and early pregnancy double the risk of maternal death and increase the chance of infant death by 28 per cent (see Government of Indonesia-UNICEF, 2000). Early marriage and early pregnancy often lead to low self-esteem and regret among women. Young pregnant women find that they must leave school, which leads to fewer opportunities later for a better job and higher income, thus resulting in increased economic dependency on their husbands or families. A significant proportion of Indonesian women marry early and become pregnant soon after marriage. The 2002/2003 DHS showed that, of women

² A mistimed pregnancy is defined as a pregnancy not wanted now, but later.

aged 15-19 years, 10 per cent had started childbearing: 8 per cent were already mothers and 2 per cent were currently pregnant with their first child (BPS and ORC Macro, 2003, p. 51). The proportion of teenagers who already were mothers rose very rapidly with age. While only 1 per cent of 15-year-olds had started childbearing, 25 per cent of women had had a baby or were in their first pregnancy by the time they reached 19 years of age. Consistent with the urban-rural pattern of early marriage, the urban-rural differential of early pregnancy stood out: 14 per cent in rural areas and 7 per cent in urban areas.

In any case, the rising age at first marriage associated with social change and modernization has likely increased the chance of unintended pregnancy, abortion or birth among unmarried adolescents. No national data exist on adolescent pregnancy, but a survey by the Indonesian Planned Parenthood Association indicated that 58 per cent of 2,558 recorded abortion cases occurred among young adults (15-24 years old) (see Government of Indonesia-UNICEF, 2000). Of those young adults, almost two thirds (62 per cent) were unmarried and usually delayed seeking an early abortion. A study among a group of unmarried pregnant females aged 15-24 years in Yogyakarta indicated that almost two thirds had attempted a self-induced abortion by drinking a herbal potion (*jamu peluntur*) or yeast with young pineapple or alcohol, or through abdominal massage performed by a traditional healer (Khisbiyah and others, 1996). If these efforts proved fruitless, they often underwent a second-trimester abortion which resulted in higher rates of complications.

4. Too old, too young, too many and too close

As previously mentioned, significant proportions of pregnancies are at high risk of morbidity and mortality as mothers are too young or too old or have already too many children when pregnant, or a pregnancy is too closely spaced following the previous birth. The 2002/2003 DHS showed that, of births during the five years preceding the survey, 20 per cent were to mothers 35 years or older (too old), 12 per cent to mothers younger than 20 years (too young) and 13 per cent were spaced closer than 24 months following the birth of a previous

child (too close) (BPS and ORC Macro, 2003, p. 48). Of the currently married women, 25.5 per cent had four or more children (too many) (BPS and ORC Macro, 2003, pp. 43-51).

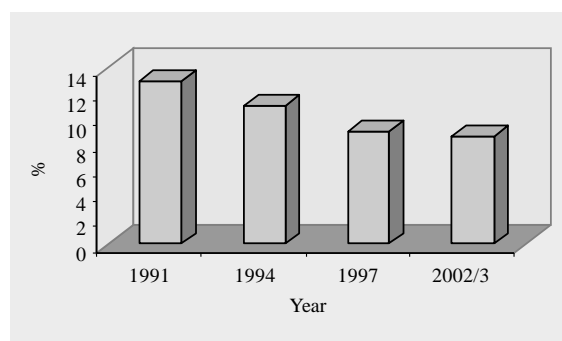
C. Intermediate determinants of maternal mortality

Access to good quality family planning and maternal health care, and women's health and nutritional status are regarded as intermediate determinants of maternal mortality.

1. Access to good quality family planning services

Access to good quality family planning services is essential to ensure that every pregnancy is wanted. If all women who want to control their fertility have access to safe and effective contraception, maternal mortality would drop by as much as 50 per cent owing to the reduced reproductive health risk related to pregnancy, childbirth and unsafe abortion (cited in Government of Indonesia-UNICEF, 2000). Child morbidity and mortality would drop significantly as well. Although contraceptive use among currently married women has increased from 57 per cent in 1997 to 60 per cent in 2002/2003, 10 per cent of Indonesian married women who want to avoid pregnancy continue not to use contraception (see figure 1). However, the real unmet need for contraception is likely to be much higher because the DHS data do not include sexually active single women of reproductive age.

Figure 1. Trends in unmet need for family planning, Indonesia



Source: Indonesia Demographic Health Surveys (CBS, NFPCIB and MI, 1995; 1998, BPS and ORC Macro, 2003).

2. Access to good quality obstetric services

Access to good quality obstetric services in Indonesia is generally limited. There is often a lack of preparedness on the part of the family, of a pregnant woman, especially in providing transportation and adequate funds. However, the health system too is often unprepared: many birth attendants are not yet ready to cope with delivery complications, a situation which in turn increases the risk of maternal death. Long physical distances, financial barriers, shortages of trained personnel and poor performance on the part of trained personnel contribute to the country's high maternal mortality ratio. Late referrals to an appropriate health facility or delays in handling the patients at the health facility are also recognized factors that contribute to maternal deaths. A study of 12 hospitals showed that 92 per cent of maternal deaths were emergency cases in which referral and case-handling were delayed, and around 40 per cent of the women died on the way to the facility (see Iskandar and others, 1996). The reduction that has occurred in maternal mortality is explained mostly by increased access to emergency obstetric care (Ronsmans, 2004).

(a) Antenatal care

According to 2002/2003 DHS data, 90 per cent of mothers received care from a medical professional during their pregnancy while 4 per cent received no antenatal care (BPS and ORC Macro, 2003). However, only 64 per cent of pregnant women received "K4 coverage" – at least one antenatal visit in the first trimester, at least one visit in the second trimester and at least two visits in the third trimester. Thus, one third of the mothers had not yet had all the recommended visits for antenatal care. The 2002/2003 DHS showed that only 51 per cent of women who had a live birth in the five years before the survey received two or more tetanus toxoid injections during pregnancy (22 per cent received one injection and 26 per cent no injection) (BPS and ORC Macro, 2003, p.123).

(b) Place of delivery

The 2002/2003 DHS showed that 40 per cent of births were delivered in a health facility: 10 per cent in a public facility (government hospital or health centre) and 30 per cent in a private health facility. This marked a significant improvement since the 1997 DHS, which showed that only 20

per cent were delivered in a health facility. The majority of births were still delivered at home (BPS and ORC Macro, 2003).

(c) Traditional birth attendants

Many women, especially in rural areas, prefer using traditional rather than modern health services. The 2002/2003 DHS showed that the coverage of deliveries assisted by a medical professional was 55 per cent (4.5 per cent by an obstetrician and 50.4 per cent by a nurse or village midwife) and that coverage varied across provinces, from 94 per cent in Jakarta to 36 per cent in East Nusa Tenggara and 42 per cent in Southeast Sulawesi (BPS and ORC Macro, 2003). Around 44 per cent of deliveries (57 per cent in rural areas and 30 per cent in urban areas) were still attended by traditional birth attendants, or relatives, or non-medical professionals.

(d) Training of community midwives

Recently, the quality of pre-service training for community midwives has been in question for various reasons, including limited opportunities for the trainees to experience a sufficient number of deliveries, a lack of qualified trainers and a lack of training facilities. Moreover, many trained midwives are still young (18-19 years old) when they are posted to their assigned villages where they must interact with senior community members, particularly traditional birth attendants. Consequently, in-service training on various topics, such as essential obstetric and neonatal clinical care, life-saving skills, clinical postpartum care, postpartum hemorrhage, and interpersonal communications and counselling skills, have been conducted for community midwives. Many of these training activities, however, have been donor-driven; thus, their sustainability has been questioned.

(e) Health personnel

The small number of obstetricians in rural areas and in areas outside Java and Bali islands has made emergency obstetric services a major concern (MOH and WHO, 2004). Most of these specialists are concentrated in large provincial cities where class-A and class-B hospitals are located. Class-C and class-D hospitals are located in district towns, while at the community level community health centres and community or village midwives (*bidan di desa*) provide mostly only basic midwifery and neonatal care.

The capacity of district hospitals in providing emergency obstetric care is often limited by the providers' lack of competence and their availability. A study in five districts of West Java showed that not all the district hospitals have an obstetrician-gynecologist on duty around the clock as intended (Iskandar and others, 1996). By 1995, only 30 per cent of hospitals were capable of providing surgical interventions for obstetric complications. Of the 704 available obstetricians, only 42 per cent of them worked in district hospitals (MOH, 1998). Of the deliveries during the five years preceding the 2002/2003 DHS, only 5 per cent were assisted by a doctor and 50 per cent were assisted by a midwife (BPS and ORC Macro, 2003).

The Government through the Health Ministry in Decree No. 572/1996 has given authority to midwives to perform life-saving procedures; however, many midwives struggle with their limited skills in such clinical procedures, as well as skills in interpersonal communication and management and supervision. The midwives are often further hampered by inadequate transportation and – early in their appointment – deep distrust on the part of community members with regard to their skills, age and social abilities. The midwives are also often not equipped with adequate drugs. An assessment report in one district of West Java indicated that most of the 20 midwives interviewed did not have a supply of magnesium sulfate (a cathartic) as recommended by the Ministry of Health (Kuningan District Health Office, 2004).

(f) *Lack of supplies and equipment*

An incomplete supply of emergency drugs and equipment in emergency obstetric neonatal care facilities was in evidence. A study of 36 health centres in Serang District, West Java, showed poor availability of the minimum necessary equipment and drugs in all 36 of them (Setiarini and others, 2004). Not all the health centres had essential newborn-care equipment, such as vacuum and suction machines, oxygen and ambulance bags. Diazepam (a drug used as a mild tranquilizer and skeletal muscle relaxant) was available in 28 of the 36 centres, magnesium sulfate in only nine of them and gentamycin (an antibiotic) and chlorhexidine hydrochloride (a topical anti-infective) were not available in any of the health centres.

(g) *Unmet need for emergency obstetric and neonatal care*

A substantial unmet need for emergency obstetric care exists. In Kuningan District, only 46 per cent of causes of obstetric complication were managed in emergency obstetric and neonatal-care facilities (Kuningan District Health Office, 2004), while in Serang District only 25 per cent of the women in need of emergency care reached the health facility (Setiarini and others, 2004).

According to the last three consecutive DHSs, the percentage of deliveries by caesarian section increased from 1 per cent in 1991 to 3 per cent in 1994 and to 4 per cent in 1997 and 2002/2003, but the percentage differed substantially between urban (6.5 per cent in 2002/2003) and rural areas (2 per cent in 2002/2003) and according to socio-economic status. According to the 2002/2003 DHS, less than 1 per cent of deliveries by caesarian section took place among the fifth poorest segment of the population, whereas 13 per cent of the deliveries by caesarian section took place among the fifth richest segment of the population (Ronsmans, 2004). These differentials indicate insufficient access to life-saving care in rural areas or among the fifth poorest segment of the population, but over-use of caesarian section in urban areas, or among the fifth richest segment of the population.

(h) *Low quality of health services*

Studies have revealed various deficiencies in the process of providing care to clients. A study of 10 health centres in Lombok, West Nusa Tenggara, showed that doctors were not satisfied with the condition of the health centres, and complained about inadequate water supply, equipment and furniture (see World Bank, 1994, p. 10). Another study on several health centres in Central Java showed that the effectiveness of health centre staff was being undermined by several factors: "flexible", personal interpretation of working hours; inappropriate deployment of human resources; personally determined ways of conducting activities; conflicts between staff factions; inadequate biomedical knowledge among nurses; overemphasis on injections and less emphasis on examinations and communication; unwillingness to become involved in various community-based health-delivery activities and failure to view villagers as partners in the health development process; arbitrary increases in

fees; heavy workload involving duplicative and inconsistent reporting and recording activities; emphasis on quantitative targets for service provision; and ceremonial rather than functional supervision (see World Bank, 1994, p. 10). Further, a study of health centres and *Posyandu* (*Pusat Pelayanan Terpadu*, or Integrated Village Health Post) in West Java, South Sulawesi and East Java provinces also disclosed deficiencies in service provision and supervision of services (see Iskandar and others, 1996). However, clients generally expressed satisfaction, even though they really had no way of knowing if the service was adequate or not; they merely trusted the health personnel.

3. Women's health status

Pre-existing morbid conditions such as tuberculosis, malaria, hepatitis, anaemia and malnutrition may worsen during pregnancy and aggravate the seriousness of pregnancy complications (Royston and Armstrong, 1989, pp. 107-136). Studies have indicated that a significant proportion of Indonesian women suffer from infections and parasitic diseases. Data from the 1995 Indonesia Household Health Survey (IHHS) showed that 5 per cent of pregnant women complained of having malaria during their pregnancy or in the postpartum period; however, only 1 per cent were confirmed by laboratory testing as having malaria. Serology tests showed that 11.5 per cent of the pregnant women were infected with the virus that causes hepatitis B (MOH, 1997b). In Purworejo, one study found that 70 per cent of pregnant women had parasites, 61 per cent were infected with whipworm (*Trichuris* intestinal nematodes), 29 per cent with *Ascaris* (large intestinal nematodes such as roundworms) and 27 per cent with hookworm (*Necator americanus*) (Nurdiati and others, 1999). Hookworm infestation is particularly devastating for pregnant women because it causes bleeding and results in anaemia and serious morbidity.

4. Sexually transmitted infections

Sexually transmitted infections (STIs) are not found exclusively among high-risk groups; they are also "bridges" of infection to the larger population, including women. Surveys among high-risk adult male groups³ have shown that most members of

these groups were married, frequently paid for sexual services provided by female sex workers and 3 to 30 per cent of them reported having had an STI (Utomo and Dharmaputra, 2001). Now there is evidence that adolescents, married women of reproductive age and school-aged children as well as abused or exploited young people in the general population are increasingly at risk of STIs, including infection with the human immunodeficiency virus (HIV) (see Government of Indonesia-UNICEF, 2000).

Studies among low-risk women in both urban and rural areas reported surprisingly high levels of STIs. A study in South Kalimantan indicated a relatively high prevalence of gonorrhea (4.3 per cent) and chlamydia (7.7 per cent) among what was expected to be a low-risk population, namely, married women, 92 per cent of whom claimed to have had only one lifetime partner (Cohen and Zazri, 1998). Studies in women seeking antenatal care or family planning services in urban areas indicated relatively high prevalence levels of chlamydia (5.2-19.5 per cent), but lower levels of gonorrhea (0-3.2 per cent) (see Dharmaputra and Utomo, 2003, p. 19). This finding is consistent with the fact that unprotected sexual activity among married women is high (BPS and ORC Macro, 2003). STIs frequently have devastating consequences for the health and social well-being of the women themselves, although as many as half of all the women with STIs may be asymptomatic.

5. Women's nutritional status

The 1995 IHHS showed that 8.4 per cent of women of reproductive age had a body height of less than 145 cm, while nearly a third had an upper arm circumference of less than 23.5 cm and 14.5 per cent suffered from chronic undernutrition, as indicated by a body mass index of less than 18.5 kg/m² (Setyowati and Utomo, 1999). Similar levels of chronic energy deficiency were also reported by other independent sources: the Crisis Surveillance Program (Helen Keller International, 1999), the 1997 Multi-Site Complementary Feeding Study (Sharma, 1998) and the Indonesia Family Life Survey (Frakenberg and others, 1999).

Iron deficiency anaemia remains a widespread problem affecting 50 per cent of pregnant women and 40 per cent of children under age 5

³ Truck drivers and their assistants, and seafarers.

(Latief and others, 1999).⁴ A study in West Java found that 36 per cent of pregnant women suffered from anaemia, 36 per cent suffered from moderate anaemia and 0.7 per cent had severe anemia (Junadi and others, 1998, cited in Government of Indonesia-UNICEF, 2000). Further, the study pointed out that 47 per cent, 62 per cent and 66 per cent of pregnant women in trimesters one, two and three respectively suffered from anaemia. Anaemia in pregnant women adversely affects both the mother and the child, increasing the rate of miscarriage, prematurity and low birth weight and often contributes to maternal and infant mortality. Anaemia increases the fatality rate from haemorrhage by reducing the ability of red blood cells to carry oxygen or by disturbing the equilibrium between blood loss and blood production. Further, chronic energy deficiency with multiple micronutrient deficiencies among mothers produces negative carry-over effects not only on the developing foetus, but also on the health of mothers themselves, including raising the risk of mortality and morbidity.

D. Distant determinants of maternal mortality

Socio-economic development and cultural factors at the population level are the distant determinants of maternal mortality. These factors affect maternal mortality through health care, health status and the timing of pregnancy.

1. Poverty

Poverty increases the risk of maternal mortality through various intermediate factors, especially the inability of the poor to obtain adequate health care. The 1998 National Socio-economic Survey showed that, of all the households surveyed, more than 90 per cent had expenditures of less than 150,000 rupiah per capita per month;⁵ 50 per cent were not meeting their basic food needs, despite spending more than 60 per cent of their financial resources on food. The problem of limited resources was more notable in rural areas, where 85 per cent of the people spent less than Rp.75,000 per

capita per month; in urban areas, the same percentage spent less than Rp.150,000 per capita per month (Government of Indonesia-UNICEF, 2000). In a recent speech at an international community forum, the Minister of Health stated that about 54 per cent of Indonesians live on less than US\$ 2 per day (MOH, 2003). Using the Human Poverty Index, one study estimated that one fourth of Indonesians are deprived of basic social services (Dhanani and Islam, 2000). With regard to household environmental health and sanitation, the 2002/2003 DHS showed that only 46.6 per cent of households had sources of in-house drinking water, and only 53.6 per cent had their own latrine (BPS and ORC Macro, 2003). Nearly a third of rural households had an earthen floor, which could promote a higher risk of parasitic infections and bacterial illnesses such as tuberculosis and respiratory infections.

Poverty is associated with a lack of access to good quality health care. One study in West Java indicated that the reasons for not seeking immediate emergency obstetric care were related not only to a lack of knowledge and lack of physical access, but also to a lack of income (Iskandar and others, 1996). A recent analysis of the 1994 and 1997 DHS data shows the obvious effect of poverty on maternal death (Graham and others, 2003). The analysis strikingly demonstrates that about a third of maternal deaths were among women in the poorest fifth of the population.

Table 1. Distribution of maternal deaths by quintile poverty grouping

<i>Poverty grouping</i>	<i>1994 (%)</i>	<i>1997 (%)</i>
1 (Poorest)	32	34
2	24	20
3	20	19
4	12	18
5 (Richest)	12	9

Source: W.J. Graham, A.E. Fitzmaurice, J.S. Bell and J.A. Cairns (2003). "The Familial Technique for linking maternal death with poverty", *Lancet*, 362.

2. Legal framework

Weakness in the substance, structure and culture of laws in Indonesia continues to aggravate the situation of women and children. For example,

⁴ A condition in which blood is low in healthy red blood cells, which carry oxygen to tissues. The mineral iron is needed to make hemoglobin, a substance in red blood cells that enables them to carry oxygen.

⁵ US\$ 1 is worth approximately Rp. 9,000.

the law on marriage (UU No.1/1974) sets the legal age for marriage at 21 years. However, it is gender-biased and oblivious to those who marry at a younger age with parental consent. The law also provides a general statement, i.e., persons under the age of 21 can marry with the consent of their parents. The law stipulates that the male partner must be 19 years old and the female partner must be at least 16 years old to marry and they both must have the consent of their parents. The ambiguity between the two statements on age requirements creates a loophole allowing for the marriage of children under the age of 16, which often has various negative consequences including high divorce rates, increasing violence against women, child prostitution and an increasing level of child labour and exploitation.

Furthermore, another law on population and prosperous family development (UU No.10/1992) stipulates that the provision of family planning services is restricted to married women. This means that only legally married couples can legally access family planning services and practise contraception. The law on health (UU No.23/1992) prohibits abortion, except for medical reasons including the survival of the mother. The law stipulates that, in an emergency situation where the mother's and the baby's lives are in danger, only a "certain medical procedure" can be conducted, but this is determined only by the Government's consent. The meaning of the term "certain medical procedure" is unclear; this term has resulted a never-ending debate on its interpretation.

Many laws and government regulations have been enacted as part of the efforts to protect the people, in particular, women and children, but there are many constraints in law enforcement and implementation. Laws also operate alongside social conventions, religious values and norms, as well as traditional rules that relate to sexual relationships and reproductive health. Sometimes they contradict each other and are ambiguous. These problems are not related so much to a lack of effective legal substance or structure, but they are more related to the social structure or cultural context related to the laws.

3. Caring behaviours of families

Indonesian families make decisions every day on health care, feeding, nutrition, hygiene and sanitation, but these decisions sometimes are harmful

and against the best interests of women and children. One study indicated that women and their families (husband, parents, in-laws etc.) have a low level of less specific knowledge on the signs and symptoms of obstetric complications, the risk events during labour, the postpartum attention that is needed and the hygienic care that should be provided for the newborn (Iskandar and others, 1996). In some parts of the country myths hold sway, i.e., that pregnant women should not eat meat and fish, because such food cause malodorous blood and breast milk. This belief negatively influences some women's diet and intake of high-protein foods (Cholil and others, 1997). A barrier to specialized referral in many high-risk pregnancies is a cultural attitude that views obstetric complications and maternal deaths as a reflection of "God's will". One study in West Java found that almost all the pregnancy-related deaths had been perceived as "not at risk" by family members and neighbours (Iskandar and others, 1996). The family members might have attempted major actions to save the woman's life, but when death did occur, it was perceived as being attributable more to fate than to the failure of the family, traditional birth attendants or professional medical workers.

4. The status of women

Indonesian women are disadvantaged in terms of education. Although the gender gap in primary school attendance has been rapidly narrowing over the past decade, the gender disparity in lower and upper secondary school enrolment stands out. The 2002/2003 DHS data showed that 62 per cent of ever-married women and 55 per cent of currently married men had only a primary school education or no schooling (BPS and ORC Macro, 2003, p. 24). Further, women with less education tend to marry at an earlier age than women with a secondary or higher education (BPS and ORC Macro, 2003, p. 101). Cultural values also pressure girls to marry at an early age in order to minimize the danger of premarital conception (Cholil and others, 1997). "Child marriages" still occur in some rural areas, often around the time of the girl's first menstruation. When they become older, many of these women regret the reality that their parents' poverty forced them to marry at an early age, often ending their attendance at school.

Once married, the woman is the one responsible for childbearing, childrearing and domestic chores, including the nurture of her husband (Cholil

and others, 1997). Married women are significantly less likely to make specified household decisions by themselves than women who are not married (BPS and ORC Macro. 2003, p. 35). Married women have authority only to administer family finances and rear children, and this limited authority constrains women's independence, autonomy and control. Besides undermining social and economic security for women, dominant values also tolerate the occurrence of violence against women.

The low status of women, including women's poor access to information and control of resources, is a key problem underlying the unfavourable situation of women and children in Indonesia. Women's low status means a lack of autonomy to make decisions to seek health care. Women with a low level of education also face limitations in improving their socio-economic status and in assessing adequate health information and services. The Indonesian Government has recognized the need to improve the status of women, but translating the intention into effective policies and gender-sensitive programmes faces strong barriers in this paternalistic culture with its traditional attitudes about the role of women in society.

5. The social crisis

After two decades of sustained economic growth and rapid social development, Indonesia entered a period of economic insecurity in mid-1997. What began as a financial crisis soon became an economic crisis, which ballooned into a full social crisis with wide-ranging effects on wages, employment, education and health services. The crisis radically transformed the nature of State governance. Indonesia entered a period of profound transition and great uncertainty, which has led to wider religious and ethnic conflicts in many regions of the country, posing threats to the survival, development and protection of the vulnerable, especially children and women (Utomo, 2002). Only recently has the economic and political situation begun to stabilize in Indonesia.

The crisis had made people's lives even more difficult as it lowered their purchasing power, increased the unemployment rate and the cost of basic commodities, health services and school tuition, among others. For women, the social and economic challenges are significant, especially in the face of the economic crisis. The worsening economic situation put greater demands on women

to act not only as the caregivers and nurturers of the family, but also as the main income earners. Thus, multiple roles for women have become unavoidable.

6. Decentralization

Following the aforementioned crisis, the Indonesian Parliament formalized the decentralization process (begun in 1999) on 1 January 2001 and the National Family Planning Programme on 1 January 2004 (World Bank, 2002). In the health sector, the Government transferred most of its responsibility for planning and managing health programmes to district and city governments. The central Government began to focus more attention on advisory and supervisory issues, with Indonesia's more than 430 district and city governments having much greater responsibility to plan, manage and finance their health programmes.

The decentralization issue has since provoked a lively debate about the capacity of local governments and communities to plan, finance and manage their new responsibilities. Although the local governments' proximity to their constituents logically makes them better able than the central Government to manage local resources and match their constituents' preferences, it is not at all clear how the local governments and communities are going to translate this rational advantage into effective operations. Weak administration or technical capacity and limited financial resources at the local level as well as the attitudes of health personnel – still used to central government control – have all raised concerns that such services may be delivered less efficiently and effectively under the new structure than had previously been the case.

III. SAFE MOTHERHOOD POLICIES AND PROGRAMMES

Safe motherhood activities have been included in many broader strategies since the late 1980s. Following the aforementioned 1987 Nairobi Initiative and in the face of continuing high maternal mortality in the country, the Minister of Health in 1989 issued a new policy to train and deploy a large number of community midwives to villages. Training and deployment of village midwives nationwide took place during the period 1990-1996. By 1996, 54,000 community midwives had been deployed to 65,000 villages.

The Government's commitment to accelerate the reduction of maternal mortality had been reiterated in 1994 when it adopted technical strategies to address the management of pregnancy and delivery complications and to focus on deliveries assisted or supervised by health personnel (MOH, 1997a). The strategies were aimed at developing a comprehensive unit of maternal care where different levels of health-care providers in the district function as referral facilities. At the first level, community midwives are targeted as first-aid providers for obstetric and neonatal emergencies. At the second level, with assistance from the district hospital, inpatient-care health centres are designed to accommodate on a 24-hour basis the provision of basic emergency obstetric and neonatal-care services. At the third and last level, the district hospital is expected to serve as a referral centre where comprehensive emergency obstetric and neonatal care is accessible on a 24-hour basis.

To institutionalize the Safe Motherhood Initiative, the President of Indonesia in 1996 launched the Mother-Friendly Movement, coordinated by the State Ministry for Women's Empowerment; the programme is aimed at mobilizing communities and providers to prevent delays in the provision of emergency obstetric and neonatal care as previously described. The Movement combines synergistic efforts to generate demand for safe motherhood among women, families and communities; improve access to trained village midwives and good quality maternal health services; and improve community and district linkages to enhance referrals and emergency care (Cholil and others, 1997).

In committing Indonesia to attaining the Millennium Development Goals, the country's president launched in 2000 the Making Pregnancy Safer Strategic Plan to reduce by 2010 the maternal mortality ratio to 125 per 100,000 live births through the implementation of four main strategies (MOH, 2001): (a) improve the access to and the quality of obstetric and neonatal services; (b) develop effective partnerships among sectors, programmes and other parties for optimum mobilization of resources; (c) facilitate the empowerment of women and families through improved knowledge to ensure healthy behaviour and utilization of maternal and neonatal health services; and (d) facilitate community involvement to ensure the availability and utilization of maternal and neonatal health services.

The Indonesian safe motherhood programme strategies seem to fit with the international policy approach – working on a variety of fronts at once to improve the status of women (through education), improve the biological condition of mothers (through nutrition and antenatal care), improve the quality of delivery assistance (through training of community midwives) and improve the availability of emergency obstetric care (through the establishment of local hospitals with specialist doctors). However, practice does not always follow theory. In many cases, the commitment to health and family planning programmes has not yet been optimally translated into operations and fiscal allocations. Commitment has been expressed through various documents, including the issuance of local government regulations (*Peraturan Daerah/Perda*), district development plans (*Program Pembangunan Daerah/Propeda*), strategic development plans (*Rencana Strategis Daerah/Renstrada*) and district development policies (*Arah Kebijaksanaan Umum/AKU*), as well as executive decrees (*SK Bupati*). For most districts, these documents have been brought to the local legislature for fiscal allocation and approval (*Anggaran Perbelanjaan dan Belanja Daerah/APBD*). Nevertheless, the health and social programmes continue to be underfunded. Both the executive and the legislative wings of the Government continue to put more priority on physical programmes than on health and social development programmes. In cases where an increase has been made in the health budget, a large portion often goes towards the purchase of high-technology medical equipment and a small portion is allocated to programme components.

The low funding of health programmes may be observed from the central Government's expenditures on health and education, which lag behind that of its neighbours in the Association of South East Asian Nations. In actual terms, the Government spent 8.4 per cent of its development budget on education and 3.4 per cent on health in 1998/1999. By contrast, Thailand and Malaysia each allocate over 20 per cent of the central Government's expenditure to education and over 6 per cent to health. Because of chronically low health spending levels, Indonesia continues to lag behind countries with a similar per capita income with regard to government outlays. For example, per capita government health expenditures in China and India have exceeded that of Indonesia, while outlays in Thailand and Malaysia were large multiples of the Indonesian figures (World Bank, 1994, p. 3).

IV. SUMMARIZED ISSUES, RECOMMENDATIONS AND CHALLENGES

On the basis of the above safe motherhood situation analysis, this section summarizes the issues, provides respective tentative recommendations and highlights the possible challenges for implementation. The issues and the respective recommendations are organized into three groups: the urgent issues to be addressed, the need for translating the safe motherhood political commitments into “real” commitments and the environmental contexts that would affect the success of implementing the safe motherhood programme.

A. Urgent issues to be addressed

1. Gap in access to life-saving care

Narrowing the gap between socio-economic classes in their access to life-saving care is essential for successfully reducing maternal mortality. However, the effort should challenge the increasingly costly health services and the not yet well-functioning health-financing scheme for the poor. A package of comprehensive, pragmatic and proactive policies on emergency obstetric and neonatal care should be developed. Improving access to adequate delivery assistance should focus on communities with a low socio-economic profile.

2. Inadequate quality of obstetric and neonatal care

District governments need to assess and improve the capacity of emergency obstetric neonatal care facilities in providing good-quality 24-hour obstetric and neonatal services. The Government should provide funds for adequate supervision and facilitation of comprehensive obstetric and neonatal care by considering the varying costs associated with geographic area coverage and terrain/transport difficulties.

3. Unsafe abortion practices

The absence of legal clarity regarding abortion calls for the establishment of a clear legal framework. This task is challenging however in view of the fact that abortion is a complex and controversial issue involving health, social, moral, religious and ethical dimensions.

4. Lack of reproductive health services for adolescents

The increasing risk of unwanted pregnancies and sexually transmitted infections among adolescents requires assured care to protect adolescents from reproductive health risks. A special, continuous effort is required in view of the long neglect of public adolescent health and family planning services.

5. Low status of women’s health and nutrition

The low status of women’s health and nutrition is an issue long associated with unfavourable community beliefs, knowledge, behaviours and access to good quality health services. Thus, the leadership of the Ministry of Health at the national level and the District Health Office at the local level is required to involve multiple sectors in order to address this issue effectively.

B. Translating “political” commitments into “real” commitments

The “political” commitment to reduce maternal mortality has not yet been optimally translated into action at the service and community levels. The maternal and perinatal health programmes continue to be underfunded and suffer from various deficiencies. While many tasks could be addressed in order to translate commitments into services, the following tasks should receive priority:

1. Improving legal clarity and enforcing the laws

Weaknesses in the substance, structure and culture of the laws in Indonesia continue to aggravate the situation of women and children. The Government needs to improve the clarity of laws and regulations and assure their implementation for the sound legal protection of women and children.

2. Strengthening technical capacity

Weak administration, limited financial resources and the continuing “uncommitted” attitude of health personnel call for strengthening the capacity of the health service sectors and improving the skills of personnel, increasing motivation and providing incentives to raise their productivity. It is

a challenging task given the limited financial resources available coupled with inefficiencies in related systems.

3. Improving the quality of pre-service training

Lack of competence among health personnel, especially midwives, has been a major issue in the provision of good quality maternal and perinatal health services; this can be traced to the low quality of pre-service training. Consequently, various in-service training programmes for health personnel have been conducted, but they are mostly donor-driven and expensive and thus not sustainable. To improve the quality of pre-service training, the Government should closely collaborate with relevant professional organizations and apply strict pre-service training curriculum standards. This would be a challenging task in view of the fact that the number of new midwifery schools has been growing rapidly.

4. Creating partnerships to mobilize resources

Delayed access to life-saving treatment for major maternal complications is caused by factors associated with the slow speed and poor quality of case referral and emergency obstetric services and the lack of community awareness of maternal risks. Addressing these issues, the Ministry of Health at the national level and the Department of Health at local levels, rather than working alone, should take the initiative to create a networking partnership with all related sectors and other related organizations in order to mobilize resources.

5. Improving supervision facilitation for service and care

Instead of passively listening to local officials, the functions of supervision and facilitation should proactively cover a wide range of tasks, ranging from quality assurance and issues related to standard procedures to the availability of appropriate training, and information, education and communication materials, the supply of medicine, equipment and other logistical matters. Above all, supervision and facilitation should be the main force for promoting professional discipline.

6. Strengthening monitoring system and operations research

While relevant accurate data are required to back up strategic programme planning and management for safe motherhood, the health data recording and reporting mechanism at all levels – central, provincial and district – has been uncertain, especially following decentralization. A monitoring system should be strengthened to produce routine relevant information concerning the course of implementation of the safe motherhood programme and concerning results at all levels. An operations research programme should also be conducted to identify whether interventions are working well in order to correct any flaws in the programme strategies and resolve problems. This is a challenging task in view of the continuing unsupportive environment for the health management information system.

C. The environmental context

1. The low status of women

The Indonesian Government has recognized the need to improve the status of women by incorporating a gender perspective in all development programmes, including the health programmes; however, translating that intention into effective gender-sensitive policies is a challenging task in view of Indonesia's strong paternalistic culture. Laws guarantee equal treatment for men and women, but these sanctioned rights are not yet widely exercised.

2. Poverty

The lack of financial resources in many Indonesian households has been associated with low access to good quality health care and clean water and sanitation. The lack of access to clean water and sanitation makes it difficult for women to maintain personal hygiene for themselves and their families, thus increasing the risk of illness.

3. Community's beliefs and awareness

A barrier to specialized referral in many high-risk pregnancies is a cultural attitude that views obstetric complications and maternal deaths as a reflection of "God's will". Fatalistic percep-

tions about obstetric complications and maternal death are associated with the consequent low level of modern care-seeking behaviour among families. The vast majority of families regard the bearing of children as the natural role of women, not a life-threatening process. People do not seem to believe that safe motherhood could be accessible to every woman as long as proper treatment is not delayed. There are still myths that pregnant women should not eat meat and fish because of concerns about malodorous blood and breast milk. Moreover, many women in Indonesia, especially in rural areas, still prefer using traditional rather than modern health services. This is related to the community members' trust with regard to the skills, age and social abilities of the village midwives.

4. Decentralization

The decentralization process that started to be put into effect in early 2001 has added greater bureaucratic constraints at the provincial and district levels. There are now more than 435 autonomous districts; however, new policy makers are not very well informed about health issues. Rather than moving the programmes closer to the community, decentralization in many districts so far has posed a threat to the continuity of family planning and health services.

V. CONCLUSION

Safe motherhood issues in Indonesia are complex, even beyond the health sector. Maternal mortality and morbidity continue to remain high. Care and services during pregnancy and delivery continue to be inadequate. Referrals and emergency obstetric care are still delayed by various complex factors. Reproductive health status and access to family planning services remain inadequate and inaccessible for many women. Contextual factors, including the low status of women, poverty, community beliefs and behaviours and decentralization, pose challenges to the efforts being made to improve the access of many women, especially poor women, to good quality family planning and obstetric care. The Government's commitment to address safe motherhood issues is strong, but that commitment has yet to be appropriately translated into operations at the service and community levels.

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References

- Barreto, T., O.M.R. Campbell, J.L. Davies, V. Fauveau, V.G.A. Filippi, W.J. Graham, M. Mamdani, C.I.F. Rooney and N.F. Toubia (1992). "Investigating induced abortion in developing countries: methods and problems", *Studies in Family Planning*, vol. 23, No. 3, pp.159-170.
- Badan Pusat Statistik (BPS) and ORC Macro (2003). *Indonesia Demographic and Health Survey 2002-2003* (Calverton, Maryland, BPS and ORC Macro).
- Central Bureau of Statistics [Indonesia], State Ministry of Population/National Family Planning Coordinating Board (NFPCB), MOH (Ministry of Health) and Macro International Inc. (1995). *Indonesia Demographic Health Survey 1994* (Calverton, Maryland, BPS and ORC Macro).
- _____. *Indonesia Demographic Health Survey 1997* (Calverton, Maryland, BPS and ORC Macro).
- Cholil, A., M.B. Iskandar and R. Sciortino (1997), *The Life Saver: The Mother Friendly Movement in Indonesia* (Jakarta, Galang Communication).
- Cohen, S. and A. Zazri (1998). "RTI/STI among women of reproductive age attending outpatient clinics in three hospitals in South Kalimantan, Indonesia", in J. Patten, ed., *Improving Reproductive Health: International Shared Experience* (Jakarta, Population Council).
- Center for Health Research University of Indonesia (CHRUI) (2001). *Incidence and Social-Psychological Aspects of Abortion in Indonesia* (Jakarta, Center for Health Research University of Indonesia and UNFPA).
- Daly, P. and F. Saadah (1999). *Indonesia: Facing the Challenge to Reduce Maternal Mortality*, East Asia and the Pacific Region Watching Brief (Washington DC, World Bank).
- Dewi, M.H.U. (1997). *Aborsi: Pro dan Kontra di Kalangan Petugas Kesehatan (Pros and Cons among Health Providers)* (Yogyakarta, Indonesia, Pusat Penelitian Kependudukan, Universitas Gajah Mada).
- Dhanani, S. and I. Islam (2000). "Poverty, inequality and social protection: Lessons from Indonesian crisis", Working Paper 00/01, Jakarta, United Nations Support Facility for Indonesian Recovery.
- Dharmaputra, N.G. and B. Utomo (2003). *Investigation of Public Health Package for STI Prevention and Care in Central Java and East Java*, report of a study supported by the World Bank (Jakarta, Population Council).
- Frakenberg, E., D. Thomas and K. Beegle (1999). "The real cost of Indonesia's economic crisis: Preliminary findings from the Indonesia Family Life Surveys", paper prepared the Demographic Institute, University of Indonesia and the Rand Corporation.
- Government of Indonesia—UNICEF (2000), "Challenges for a new generation: The situation and children and women in Indonesia, 2000", document, Jakarta.
- Goodburn, E.A., R. Gazi and M. Chowdury (1995). "Beliefs and practices regarding delivery and postpartum maternal morbidity in rural Bangladesh", *Studies in Family Planning*, vol. 26, No. 1, pp. 22-32.
- Graham, W. J., A. E. Fitzmaurice, J. S. Bell and J. A. Cairns (2003). "The familial technique for linking maternal death with poverty", *Lancet*, vol. 363, No. 9402, pp. 23-27.
- Helen Keller International (HKI) (1999). "Indonesia's crisis: A comparison of its impact on nutrition and health in urban and rural populations", HKI and Government of Indonesia Nutrition Surveillance System, August, Jakarta, Helen Keller International.

- Iskandar, M., B. Utomo, T. Hull, N. Dharmaputra and Y. Azwar (1996). *Unraveling the Mysteries of Maternal Deaths in West Java* (Depok, Indonesia, Center for Health Research University of Indonesia).
- Khisbiyah, Y.D., Murdiyana, and Wijayanto (1996). *Kehamilan tak Dikehendaki di Kalangan Remaja* (Yogyakarta, Indonesia, Pusat Penelitian Kependudukan, Gajah Mada University).
- Kuningan District Health Office (2004). "Results from an assessment of the performance of maternal and neonatal health services focused on reducing maternal and neonatal deaths," report, Kuningan District Health Office, West Java, with technical assistance provided by Management Science for Health, Program for Appropriate Technology, and JHPIEGO Maternal and Neonatal Health Project, in collaboration with the Decentralization Support Unit, Ministry of Health, and Cianjur District Health, West Java, Jakarta, Management Science for Health and Ministry of Health Republic of Indonesia.
- Latief, D., A. Kurniawan, E. Schoffelen and V. Krause (1999). "Indonesia experience on research and program development to overcome micro-nutrient deficiencies", paper presented at the Joint Symposium on micro-nutrient issues in Indonesia, Surakarta, 2-3 March 1999, Surakarta, University of Sebelas Maret and University of Sheffield.
- Lettenmaier, C., L. Liskin, C.A. Church and J.A. Hariss (1988). "Mothers' lives matter: Maternal health in the community", W. Rinehart, ed., *Population Report*, Series L, No. 7, pp. 1-31.
- Loudon, I. (1992). *Death in Childbirth: An International Study of Maternal Care and Maternal Mortality 1800-1950* (Oxford, Clarendon Press).
- McCarthy, J. and D. Maine (1992). "A framework for analyzing the determinants of maternal mortality", *Studies in Family Planning*, vol. 23, No. 1, pp. 23-33.
- Ministry of Health (MOH) (1997a). *Strategies to Accelerate the Reduction of Maternal Mortality* (Jakarta, Ministry of Health Republic of Indonesia).
- _____ (1997b). *Survei Kesehatan Rumah Tangga (SKRT 1995)* (1995 Household Health Survey) (Jakarta, Institute for Health Research and Development, Ministry of Health Republic of Indonesia).
- _____ (1998). *Profil Kesehatan Indonesia 1998* (Indonesian Health Profile 1998), (Jakarta, Center for Health Data, Ministry of Health Republic of Indonesia).
- _____ (2001). *National Strategic Plan: Making Pregnancy Safer (MPS) in Indonesia 2001-2010* (in Indonesian) (Jakarta, Ministry of Health Republic of Indonesia).
- _____ (2003). "Poverty and health", Health Minister's speech to the representatives of the international community, Jakarta, 11 December, Ministry of Health Republic of Indonesia.
- _____ and WHO (2004). *The 2003 Indonesia Reproductive Health Profile* (Jakarta, Ministry of Health Republic of Indonesia and World Health Organization).
- Nurdiati, D.S., S. Sumarni, Suyoko, M. Hakimi and A. Winkvist (1999). "Intestinal helminthic infection, hemoglobin and ferritin status during pregnancy", paper presented at the Ministry of Health Community Nutrition Directorate, Jakarta, 29 August, University of Gajah Mada and University of Newcastle.
- Ronsmans, C. (2004). Organizing delivery care: What works for safe-motherhood (evidence from case studies), slide materials presented at Jakarta, June 2004, IMMPACT.
- Royston, E. and S. Armstrong (1989). *Preventing Maternal Deaths* (Geneva, World Health Organization).
- Setiarini, A., H. Khusun, L. Guarenti and I. Batubara (2004). *An Assessment of Emergency Obstetric and Neonatal Care Services at Serang District, West Java* (Jakarta, Ministry of Health Republic of Indonesia and World Health Organization).

- Setyowati, T. and B. Utomo (1999). "Relationship of maternal nutrition status and morbidity", in S. Soemantri and others, eds., *Maternal Morbidity and Mortality Study: CHN-III/Household Health Survey 1995* (Jakarta, Ministry of Health and National Institute of Health Research and Development).
- Sharma, S., S. Bunch, J.M. Peerson, S. Murphy, K.H. Brown, H. Hermana, M. Karmini, B. Utomo, M. Hakimi, A. Suyono, S. Kardjati, R. Thaha and V. Hadju (1998). *Complementary Feeding Practices of Young Children: Results of a Multi-site Study*, report on pre-lacteal feeding, breastfeeding and other feeding practices, December (Jakarta, UNICEF).
- Soekirman (1994). "Rancangan pembangunan sumber daya manusia dan peningkatan peranan wanita dalam PJP II dan Repelita VI" (Human resources development plan and the role of women in the Second Long Development Plan and the Sixth Five-Year Development Plan), paper presented at the national seminar Wanita, Kesehatan, dan Pembangunan on 12 January, Jakarta, Kantor Menteri Negara Urusan Peranan Wanita.
- Soemantri, S. and T. Setyowati (2004). "Perkembangan mortalitas Indonesia: Besaran dan kecenderungan" (Levels and trends of mortality in Indonesia), paper presented at roundtable discussion on 17 demographic indicators, 8 July, Jakarta, IPADI, UNFPA and BKKBN.
- Thaddeus, S. and D. Maine (1994). "Too far to walk: Maternal mortality in context", *Social Science and Medicine*, vol. 38, No. 8, pp.1091-110.
- Tinker, A. and M.A. Koblinsky (1993). "Making motherhood safe", World Bank Discussion Paper No. 202 (Washington DC, World Bank).
- Utomo, B. (2002). "Health status in Indonesia during the economic crisis", in A. Ananta, ed., *The Indonesian Crisis: A Human Development Perspective* (Singapore, Institute of Southeast Asian Studies).
- Utomo, B. and N.G. Dharmaputra (2001). *Findings of the Behavioral Surveillance Surveys (1996-2000) among Female CSWs and Male Respondents* (Jakarta, Center for Health Research, University of Indonesia and Family Health International).
- Utomo, B., S. Jatiputra and A. Tjokronegoro (1982). "Abortion in Indonesia: A review of the literature", Jakarta, Faculty of Public Health, University of Indonesia.
- Winikoff, B. and M. Sullivan (1987). "Assessing the role of family planning in reducing maternal mortality", *Studies in Family Planning*, vol. 18, No. 3, pp.128-143.
- World Bank (1994). "Indonesia's health work force: Issues and options", Report No. 12835-IND, Population and Human Resource Division, Country Department III, East Asia and Pacific Regional Office, Washington DC, World Bank.
- World Bank (2002). *Decentralization and Health in the Philippines and Indonesia: An Interim Report*, East Asia and Pacific Update, Singapore, <[http://lnweb18.worldbank.org/eap/eap.nsf/attachments/eapupdate0402/\\$file/specialfocus.pdf](http://lnweb18.worldbank.org/eap/eap.nsf/attachments/eapupdate0402/$file/specialfocus.pdf)>, accessed on 7 February 2004.

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PART THREE

Shifts in Age and Disease Patterns

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Chapter VII

Achieving the MDGs: Health and Mortality Trends in Malaysia

Chee Heng Leng*

In the United Nations Millennium Declaration,¹ Governments resolved to achieve eight Millennium Development Goals (MDGs) by the year 2015. Some of these goals were stated in stark numerical terms, for example, to halve the proportion of people with an income of less than one United States dollar per day between 1990 and 2015. However, even for the goals that were not stated in such terms, numerical indicators for monitoring progress were clearly spelled out.²

With assessment of progress and achievement being based on averages and aggregates, it has been pointed out that, while none of the goals were on track towards achieving their targets overall at the global level by 2000, the reality is that there is a very uneven pattern of progress (Vandermoorle, 2002). Although the prospects for achieving the MDGs are slim, or even nil, for many developing countries, there are others that will probably be able to reach, and even exceed, some of the goals. Even within a “successful” country, there are often wide disparities, with some social groups being left behind.

In general, East and South-East Asia are considered areas where the MDGs have been met, or are on track for being met (UNDPI, 2004). While

there may be countries in these parts of Asia which require increased efforts and resources for achieving the MDGs, Malaysia is one country that has shown remarkable progress. This paper is a review of the achievements of Malaysia with regard to two of the MDGs: to reduce the under-five mortality rate by two thirds, and to reduce the maternal mortality ratio by three fourths, between 1990 and 2015. While the overall national achievement has been good, there are nevertheless particular social groups and geographical areas where progress is slower. The aim of the paper is to identify these groups and areas and to describe the respective health problems for the purpose of recommending where increased efforts and resources should be directed.

In terms of its background, Malaysia is a federation consisting of 11 states in Peninsular Malaysia (formerly Malaya), and the eastern states of Sabah and Sarawak located on the island of Borneo. Table 1 shows the current population and development indicators for the whole country. The most recent population census enumerated almost 23.3 million people, the majority of whom were Malay and other indigenous ethnic groups. The urban population is now 62 per cent of the total, and the average national income is RM 3,361 (US\$ 516) per capita.³

Although all three entities were formerly British colonies, Malaya was granted independence in 1955, while Sabah and Sarawak joined the federation only in 1963. Sabah and Sarawak are also distinct from Peninsular Malaysia in terms of

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¹ A resolution adopted by the United Nations General Assembly on 18 September 2000.

² The approach underlying the MDGs has been criticized for lacking analytical coherence, for being abstracted from the social, political and economic context in which they are to be implemented, and for being a distraction from other international instruments such as the Beijing Platform for Action. See, for example, Antrobus (2003). While the limitations of the MDGs are recognized, the author does not go into a discussion of these issues in this paper.

³ After the 1997 Asian financial crisis, the Malaysian Government fixed the exchange rate at US\$1.00 to RM 3.80, which is currently still in use.

Table 1. Population and development indicators for Malaysia, 2000-2002

Population in 2000	23.27 million
Population estimate, third quarter of 2002	24.66 million
Ethnic breakdown (2000)	
Bumiputra (Malays and other indigenous ethnic groups)	65.1%
Chinese	26.0%
Indian	7.7%
Others	1.2%
Urban population (2000)	62.0%
Dependency ratio (2000)	59.2%
Gross national income per capita at current prices (2002)	RM 13,361.00
Crude death rate (2002)	4.4 per 1,000
Infant mortality rate (2002)	6.7 per 1,000
Life expectancy at birth (2002)	
Males	70.69 years
Females	75.25 years

Source: Department of Statistics Malaysia (2002) *Yearbook of Statistics 2002* (Kuala Lumpur: Department of Statistics, Malaysia).

historical development, geographical terrain and population demographics. The major ethnic groups in Peninsular Malaysia are the Malays, Chinese and Indians; but in Sabah and Sarawak, ethnic diversity is much greater. In this paper, therefore, these three entities are often treated separately.⁴

I. TRENDS IN MORTALITY

Past studies have documented the rapid fall in mortality rates in Peninsular Malaysia. For example, Kwok (1982) examined the trend and rate of decline in infant mortality rates from 1950 to 1978, and Tan and others (1987) made the observation that mortality declines had occurred across all ethnic groups and geographical regions, although the rates of decline have not been similar for all subgroups in every time period. These studies were based on the registration of births and deaths, and generally attributed the rapid improvement in mortality to socio-economic development, which includes sanitation and nutrition, as well as the introduction of effective medical and health technologies after the Second World War (see also United Nations, 1993).

More specific analysis of data from the Malaysian Family Life Survey 1976-1977, a population-based probability sample survey of households in Peninsular Malaysia, pinpointed mothers' education as the most consistent factor accounting for the decline in infant mortality rate between 1941 and 1975, compared with improvements in water and sanitation, which became less important over time. Nevertheless, the greater part of the decline had been due to factors that were not measured in this analysis, which the writers identified as income growth and improvements in medical and health care (DaVanzo and Habicht, 1985).⁵

Other studies making similar observations of declining mortality rates⁶ have attributed the rapid fall in child mortality in the 1960s and 1970s not only to socio-economic development, but also more specifically to the primary health-care programmes, in particular, the rural health programme developed after 1960, and other corollary programmes such as the applied food and nutrition programme. The rural health programme achieved a wide distribution of primary health-care services through midwife

⁴ Official statistics are often given separately for Peninsular Malaysia, Sabah and Sarawak, and it is also more expeditious to treat them independently.

⁵ Other papers on child mortality from this study are DaVanzo and Habicht (1985), DaVanzo (1984) and Butz and others (1982).

⁶ Rajakumar and others (1980) and Chee (1990).

clinics and rural health clinics within a very short period of time. In 1960, the midwife- clinic-to-rural-population rate was 1:121,000; by 1965, it had improved to 1:7,300. In 1975, when midwife clinics were being upgraded to rural clinics, the rate had further improved to 1:4,400⁷ (Abu Bakar and Jegathesan, n.d.).

Vital statistics for the two eastern states of Sabah and Sarawak are officially considered less accurate in comparison to those for the peninsula.⁸ Birth and death registration are considered incomplete owing to the rough geographical terrain and a less widely distributed and established primary health-care network. As such, Kwok (1982) used indirect methods on the 1960 and 1970 population census data, and made estimates of the infant mortality rates for Sabah and Sarawak. In the period 1955-1958, the 1960 census-based estimates

of infant mortality were an average of 167 per 1,000 live births for Sabah and 132 per 1,000 live births for Sarawak.⁹ Based on the 1970 census,¹⁰ the estimates of infant mortality for 1967 were 84 per 1,000 live births for Sabah and 65 per 1,000 live births for Sarawak, both higher than the 45 per 1,000 live births recorded for Peninsular Malaysia in 1967 (Department of Statistics, 1991). It should be noted that the mortality declines for Sabah and Sarawak started much later than in Peninsular Malaysia (Tan and others, 1987).

A. Child mortality

In Peninsular Malaysia, the decline in mortality rates has been consistent until the current period. In the 30 years between 1960 and 1990 (table 2), the infant mortality rate fell from 68.9 per

Table 2. Mortality indicators for Peninsular Malaysia, 1960-1990

	1960	1965	1970	1975	1980	1985	1990
Crude death rate (per 1,000 population)	9.5	7.9	7.3	6.4	5.5	5.3	4.9
Perinatal mortality rate (per 1,000 live births)	–	39.3	36.9	32.0	26.7	19.3	13.9
Neonatal mortality rate (per 1,000 live births)	30.1	26.5	22.9	20.4	14.8	10.7	8.4
Infant mortality rate (per 1,000 live births)	68.9	50.1	40.8	33.2	24.1	17.0	13.1
Toddler mortality ^a rate (per 1,000 children 1-4 years old)	8.0	5.8	4.20	3.1	2.0	1.4	0.91
Maternal mortality ratio (per 100,000 live births)	240	200	150	80	60	37	20
Life expectancy at birth (years):							
Females	58.2 ^b	66.0 ^c	65.6	68.7	70.5	72.4	73.5
Males	55.8 ^b	63.1 ^c	61.6	64.3	66.4	67.7	68.9

Sources: Department of Statistics Malaysia (1991). *Vital Statistics Time Series Peninsular Malaysia 1911-1985*; *Vital Statistics Malaysia* (various years); *Abridged Life Tables Peninsular Malaysia* (various years) (Kuala Lumpur: Department of Statistics, Malaysia).

^a The term “toddler mortality” refers to the death of children between one and five years of age.

^b For 1957.

^c For 1966.

⁷ These figures are for Peninsular Malaysia only.

⁸ See the introduction to various issues of *Vital Statistics* from 1991 onward. Nevertheless, this view is contested in the case of Sarawak by Khoo Khay Jin in his “Health care in Sarawak” paper presented at the “Health care in Malaysia” workshop at the Asia Research Institute, National University of Singapore, 9-11 September 2004, where he claimed that the vital statistics for Sarawak were reliable from 1980s onward.

⁹ These estimates excluded the Chinese because census data for Chinese child mortality was found to be unreliable owing to extreme underreporting.

¹⁰ According to this study, the 1970 census had a downward bias compared with the 1960 census, which was considered more accurate. This means that actual rates could be higher.

1,000 live births to 13.1, that is, by 80 per cent; while child mortality rate fell from 8.0 per 1,000 live births to 0.9 per 1,000 live births, that is, 88 per cent. Life expectancy rose in parallel from 58.2 years for females and 55.8 for males to 73.5 years for females and 68.9 years for males between 1960 and 1990.

Although mortality rates for Sabah and Sarawak were tabulated for earlier years, consolidated rates from the vital registration data for the whole of Malaysia were more systematically documented only from 1991 onward (table 3). For Malaysia as a whole, between 1991 and 2000, the infant mortality rate dropped from 12.5 to 7.7 per

Table 3. Mortality indicators for Malaysia, 1991-2000

	1991	1995	1998	2000
Crude death rate (per 1,000 population)	4.6	4.7	4.6	4.5
Peninsular Malaysia	4.8	5.0	4.9	
Sabah	3.4	3.2	2.7 ^a	
Sarawak	3.7	4.0	4.1 ^a	
Perinatal mortality rate (per 1,000 live births)	12.0	9.7	7.9	10.0
Peninsular Malaysia	12.3	—	—	
Sabah	13.4	12.1	8.1	
Sarawak	7.3	6.1	4.2	
Neonatal mortality rate (per 1,000 live births)	8.1	6.8	5.2	3.9
Peninsular Malaysia	7.6	6.3	5.1	
Sabah	12.3	11.1	8.0	
Sarawak	6.7	4.5	3.6	
Infant mortality rate (per 1,000 live births)	12.5	10.3	8.5	7.7
Peninsular Malaysia	12.1	9.8	8.5	
Sabah	17.8	16.7	11.5	
Sarawak	9.5	7.5	6.2	
Toddler mortality rate (per 1,000 children 1-4 yrs)	0.9	0.8	0.7	0.5
Peninsular Malaysia ^b	1.0	0.7	0.7	
Sabah	1.0	1.1	0.5	
Sarawak	0.6	0.5	0.5	
Maternal mortality ratio (per 100,000 live births)	20	20	30	3.0
Peninsular Malaysia	20	20	20	
Sabah	30	20	40	
Sarawak	10	10	20	
Life expectancy at birth (years)				
Females	73.4	74.1	74.6	74.9
Males	69.2	69.4	68.6	70.4

Sources: Department of Statistics Malaysia (2000). *Vital Statistics Malaysia (Special Edition)*; (1999) *Vital Statistics Malaysia 1999*; (1996) *Vital Statistics Malaysia 1996*; (1995) *Vital Statistics Malaysia (Special Release) 1991-1993*; (1994) *Vital Statistics Malaysia (Preliminary Release) 1992*; (1993) *Vital Statistics Malaysia (Preliminary Release) 1991*; (2003) *Abridged Life Tables 2000-2002 Malaysia*; (1999) *Abridged Life Tables 1996-1998 Malaysia*; and (1997) *Abridged Life Tables 1991-1996 Malaysia* (Kuala Lumpur: Department of Statistics, Malaysia).

^a For the year 1997.

^b These rates were calculated by the author.

1,000, and the toddler mortality rate from 0.9 to 0.5 per 1,000 (table 3; see also footnote “a” of table 2). These drops exceeded by far the MDG target rate of a two thirds reduction within 25 years.¹¹

Mortality rates for Malaysia as a whole did not differ much from Peninsular Malaysia even though the additional population of Sabah and Sarawak constituted 20 per cent of the total (population census 2000). Although the mortality rates for Sabah were generally higher than the national rates, this situation has been balanced by the consistently lower rates for Sarawak. These lower rates have been attributed to incomplete registration, although this assumption may be called into question, at least by the 1990s, as there is no reason why registration data for Sarawak should be more incomplete than that of Sabah.

B. Maternal mortality

An earlier study on Peninsular Malaysia had compared the age-specific death rates between males and females for the periods 1967-1969 and 1977-1979, and found that the most remarkable improvement, other than in the 0-5 year age group, was registered in the reproductive age group for females (15-49 years) (Tan and others, 1987). Prior to 1970, female mortality had exceeded male mortality, particularly in the childbearing ages of 15-39 years, but since then, female mortality had been lower than that of males (Fernandes, 1988, as cited in United Nations, 1993). This decline in female mortality has been attributed to the fall in maternal mortality as a result of better medical and health services, older ages at marriage and childbearing, and increased spacing between successive childbearing (United Nations, 1993). In addition, maternal mortality was found to have fallen sharply in the early 1970s across the three major ethnic groups in Peninsular Malaysia, namely, the Malays, Chinese and Indians.

Since 1991, official documents have reported the maternal mortality ratio as being between 20 and 30 per 100,000 live births (table 3). In 1991, however, a system of confidential enquiry into

maternal deaths was initiated (Ministry of Health, 1996, p. 142), following which the number of maternal deaths that had been reported increased more than twofold. It was found that previous data were underenumerated, and the more reliable estimates were 44 per 100,000 live births in 1991, 48 in 1992 and 46 in 1993. Nevertheless, the adjusted ratio of 41 per 100,000 live births compares favourably with other developing countries (table 4), although geographical disparities exist within the country, with rural states being worse off (Abu Bakar and Jegathesan, n.d.).

C. International comparisons

Table 4 shows the comparability of Malaysia's mortality indices with other countries. The infant mortality rate for the country as a whole has been below 10 per 1,000 live births since the late 1990s, a rate that is comparable to that of developed countries such as the United States of America (7 per 1,000 live births) and Australia (6 per 1,000 live births), as well as developing countries that have high human development indices such as Cuba (7 per 1,000 live births) and Costa Rica (9 per 1,000 live births). Between 1970 and 2002, the infant mortality rate in Malaysia dropped from 46 to 8 per 1,000 live births, surpassing the average rates for East Asia and the Pacific (which dropped from 84 to 32 per 1,000 live births in the same time period), and comparable to the average rates for countries in the Organisation for Economic and Development Cooperation (which dropped from 40 to 11 per 1,000 live births) (UNDP, 2004). In 2002, Malaysia's female life expectancy at birth was 75.6 years compared with 80.2 in Singapore, 79.8 in the United States and 80.6 in the United Kingdom of Great Britain and Northern Ireland. Other developing countries with a comparable level of achievement in female life expectancy are China, Costa Rica, Cuba, Sri Lanka and Thailand.

D. Geographical disparities

While mortality rates have fallen to low levels, the improvement is not evenly distributed throughout the country. With the exception of Sabah, birth and death registration data are based on place of usual residence of the mother or the deceased, while in Sabah it is based on place of occurrence (Department of Statistics, 2000). The infant mortality rate, as an overall indicator of

¹¹ In order to achieve the two thirds reduction in 25 years and assuming a linear rate of reduction, the infant mortality rate would have to have been 9.2 per 1,000 and the toddler mortality rate would have to have been 0.7 per 1,000 in 2000.

Table 4. International comparisons of mortality indicators

	<i>Infant mortality rate (per 1,000 live births)</i>		<i>Under-five mortality rate (per 1,000 live births)</i>		<i>Maternal mortality ratio^a (per 100,000 live births)</i>		<i>Life expectancy at birth (years) 2002</i>	
	1970	2002	1970	2002	Reported ^b 1985-2002 ^d	Adjusted ^c 2000	Females	Males
Malaysia	46	8	63	8	30 ^e	41	75.6	70.7
Thailand	74	24	102	28	36	44	73.4	65.2
Singapore	22	3	27	4	6	30	80.2	75.8
Philippines	60	29	90	38	170	200	71.9	67.9
Indonesia	104	33	172	45	380	230	68.6	64.6
United States	20	7	26	8	8	17	79.8	74.2
United Kingdom	18	5	23	7	7	13	80.6	75.6
Japan	14	3	21	5	8	10	85.0	77.8
Australia	17	6	20	6	—	8	82.0	76.4
India	127	67	202	93	540	540	64.4	63.1
Pakistan	120	83	181	107	530	500	60.7	61.0
Bangladesh	145	51	239	77	380	380	61.5	60.7
China	85	31	120	39	53	56	73.2	68.8
Cuba	34	7	43	9	30	33	78.6	74.7
Costa Rica	62	9	83	11	29	43	80.5	75.7
Sri Lanka	65	17	100	19	92	92	75.8	69.8

Source: United Nations Development Programme (2004). *Cultural Liberty in Today's Diverse World, Human Development Report 2004*, accessed on 6 August 2004 <<http://hdr.undp.org/reports/global/2004/>>, pp. 168-171, 217-220.

^a Deaths of women from pregnancy-related causes.

^b Reported by national authorities.

^c Adjusted by the United Nations Children's Fund (UNICEF), World Health Organization (WHO) and United Nations Population Fund (UNFPA) for underreporting and misclassification.

^d Data are for the most recent year available in this period.

^e A more recently reported figure is 20 per 100,000 live births.

economic and social development, can therefore be taken to reflect geographical disparities in development.

Table 5 compares the infant mortality rate in the various states in the country over the larger part of the decade of the 1990s. The rural states of Pahang, Sabah and Terengganu were among the five states with the highest infant mortality rates both in 1991 and 1998. While Kelantan (also predominantly rural) had very high infant mortality rates in 1991, the level had decreased considerably by 1998. Sarawak, comparable to Melaka in terms of proportion rural, showed much better improvement.

The other seeming aberration is the infant mortality rate for the capital city of Kuala Lumpur, which not only increased between 1991 (10.5 per 1,000 live births) and 1998 (11.5 per 1,000 live births), but was among the five highest in 1998.

This could reflect the fact that most of the referral hospitals are in Kuala Lumpur and that "place of usual residence" may not have been strictly adhered to when deaths were registered. On the contrary, this increased rate may also reflect the in-migration of people from the rural areas or immigration from other countries (including undocumented transnational migrants), and their poor living conditions in terms of housing, environment, sanitation and nutrition.

Disaggregated data for rural and urban areas are available for the states of Peninsular Malaysia, although not for Sabah and Sarawak. Overall, infant mortality rates improved between 1991 and 1998. Urban rates also improved by a larger quantum compared with rural rates, with the exceptions of Kuala Lumpur (as previously noted), Melaka (no improvement in either rural or urban areas) and Kedah (no improvement in the urban areas). Generally, rural rates were higher than urban rates, except

Table 5. Infant mortality rate, by states, rural and urban areas, 1991 and 1998

	Infant mortality rate (per 1,000 live births)						Percentage rural (1999)
	1991	1998	1991		1998		
			Rural	Urban	Rural	Urban	
Malaysia	12.5	8.1 ^b	—	—	—	—	42
Peninsular Malaysia	12.1	8.5	12.7	11.0	9.2	7.9	
Kuala Lumpur ^a	10.5	11.5	—	10.5	—	11.5	0
Selangor	11.4	5.9	11.7	11.1	7.4	5.5	12
Pulau Pinang	10.3	7.8	9.3	11.5	7.5	8.0	15
Perak	9.1	7.1	9.4	8.3	8.1	6.4	34
Johor	13.0	7.6	13.8	11.6	9.3	6.2	45
Melaka	10.0	9.5	10.6	8.0	10.8	7.8	51
Negeri Sembilan	11.0	7.8	11.9	9.2	8.5	6.8	53
Terengganu	16.0	11.4	16.5	14.9	12.3	10.2	54
Kedah	12.6	9.5	13.2	10.7	8.5	10.7	59
Kelantan	15.4	9.6	16.0	13.8	8.9	11.1	61
Perlis	10.4	8.7	11.5	3.2	4.4	14.9	66
Pahang	12.7	10.8	12.9	11.7	11.9	8.5	67
Sarawak	9.5	6.2 ^b	—	—	—	—	51
Sabah	17.8	11.5 ^b	—	—	—	—	62
Labuan ^a	—	24.1 ^b	—	—	—	—	

Sources: Department of Statistics Malaysia (2000). *Vital Statistics Malaysia (Special Edition)* (Kuala Lumpur: Department of Statistics Malaysia); and Ministry of Health (2001). *Malaysia's Health 2001* (Kuala Lumpur: Ministry of Health), p. 272.

^a Federal Territories; note that Kuala Lumpur, the capital city, is 100 per cent urban.

^b Based on preliminary estimates of births taken from Vital Statistics 1999 (Kuala Lumpur: Department of Statistics Malaysia).

for Pulau Pinang, where urban rates were higher in 1991 and no marked difference was recorded in 1998, as well as in Kedah and Kelantan, where urban rates were higher in 1998 than in 1991. The rates for Perlis were spurious because of the small numbers (41 deaths in 1998).

II. DISEASE PATTERNS AND MORBIDITY

A. Disease-specific mortality

An overall view of disease patterns may be obtained from death registration and health services-based data, although it should be noted that both sources have their limitations. Although the vital registration data in Peninsular Malaysia are of good quality, since they first became available in 1964, only 30 to 45 per cent of all deaths were ever medically certified and inspected and, therefore,

could be classified into distinct disease categories. In 1998, for example, the proportion of deaths that were medically certified and inspected was 44 per cent. Health services-based data, whether on mortality or morbidity, are available only for the public sector.¹² As the private hospital sector has been catering to an increasing proportion of patients, particularly from the early 1980s onward, the picture presented by public hospital mortality and morbidity data will become increasingly skewed.¹³ It should also be noted that other than the specific list of communi-

¹² Pending the implementation of the Private Health Care Facilities and Services Act 1998, which includes regulations requiring private health-care facilities to submit data.

¹³ In 1980, private hospital beds accounted for 4.7 per cent of total hospital beds, but in 2000, this figure was 21.9 per cent. As a rough indicator, the number of admissions to private institutions was about one quarter that of admissions to government institutions in 1997 (Ministry of Health, annual reports).

cable diseases for which notification is compulsory,¹⁴ health services-based data exclude people who may be ill but who do not seek health care in the formal state sector. For some illnesses, such as mental illness, this could be an important omission.

One study of death registration data between 1964 and 1983 categorized three types of diseases: infectious diseases, nutrition-related diseases and cardiovascular diseases (Chee, 1990). It was found that in the 1960s infectious diseases were still the predominant cause of death, but by 1970, cardiovascular diseases started to overtake infectious diseases. Government hospital data showed a similar trend of heart diseases growing in importance as the principal cause of death through the 1970s, eventually overtaking diseases of early infancy and other infectious diseases. The list of 10 principal causes of death in Ministry of Health hospitals are heart disease and diseases of pulmonary circulation (15.8 per cent of all causes), followed by septicaemia (13.7 per cent), malignant neoplasm (9.3 per cent), cerebrovascular diseases (9.3 per cent) and accidents (7.9 per cent) (Ministry of Health, 2000). Among the cardiovascular diseases, the most important cause of death is ischaemic heart disease (Ministry of Health, 2001).

Official sources characterize this trend as a transition to “diseases of affluence and lifestyle” or “diseases of development” identified as cancer, hypertension, heart and respiratory diseases and trauma, leading to the construction of the concept of the *new* public health which “has to contend with new challenges associated with increasing longevity, overpopulation, increasing industrialization and industrial decline, inequities in health, environmental damage and ecological imbalance” (Abu Bakar and Jegatheesan, n.d., pp. 19-29 and 408, 409). Nevertheless, it is acknowledged that infectious diseases, in particular, HIV/AIDS, dengue fever, tuberculosis and malaria, will continue to pose a challenge.

B. Diseases and ill-health

The most recent and comprehensive source of data on morbidity and diseases is the Second National Health and Morbidity Survey. In the pre-

liminary preparation for this survey, programme and state managers in the Ministry of Health were asked to identify the problems and issues to be included, and the list was revealing of the types of health problems dealt with by ground-level health service personnel (Maimunah and others, 1998). Other than cardiovascular diseases and associated conditions, that is, hypertension, diabetes and obesity, as well as the predominant cancers (gastrointestinal, liver, cervical, breast, nasopharyngeal, gastric and genitourinary),¹⁵ a long list of infectious diseases was identified as important public health problems.

One major problem pointed out by the health personnel was the upsurge in communicable diseases, namely, leprosy, tuberculosis, sexually transmitted diseases, and food and waterborne diseases. The spread of these was attributed to foreign migrant workers, particularly in urban areas.¹⁶ The concern with tuberculosis was that it is now seen among the economically productive age group rather than the older population (more than 60 years old); and also that its incidence was high in spite of good BCG (bacille Calmette Guérin) vaccination coverage.

Among children, a major health problem identified was intestinal worm infestation in rural and urban squatter communities. It was pointed out that intestinal protozoans were common in rural areas where the water supply is not safe, and diarrhoea among children was common. Many children who failed to thrive, began to grow only after treatment for giardiasis.¹⁷ The other infections common among children were identified to be urinary tract infections and acute respiratory infections, which were important causes of outpatient attendance and hospital admissions in young children.

¹⁴ Even so, private practitioners do not adhere fully to the notification regulations.

¹⁵ The first report of the National Cancer Registry (2002) reported the incidence rates of various cancers among the population of Peninsular Malaysia (Lim and others, 2003). Sabah and Sarawak were omitted because the cancer registration in these two states was considered incomplete. According to this report, the most frequent cancers (in order of decreasing frequency) in men were lung, nasopharynx, colon, leukaemia, rectum and prostate; and in women, breast, cervix, colon, ovary, leukaemia and lung.

¹⁶ The Ministry of Health estimated, in 1997, that the proportion of cases due to foreigners in the country was 13 per cent for tuberculosis, 30 per cent for leprosy, 18 per cent for malaria, 3 per cent for dengue and 2 per cent for HIV infections (Abu Bakar and Jegatheesan, n.d., p. 225).

¹⁷ Infection of the intestines with a protozoan of the genus *Giardia* (especially *G. lamblia*), found in contaminated food and water; it causes diarrhoea, nausea, flatulence and abdominal discomfort.

Two vector-borne diseases identified as meriting attention were malaria and dengue fever. Malaria was a concern for indigenous populations and immigrant workers employed in rural land schemes, while the incidence of dengue fever, a problem largely related to sanitation in homes and neighbourhoods, was high in the urban areas of Kedah, Kelantan and Terengganu, while relatively lower in Kuala Lumpur, Pulau Pinang and Selangor. Among the non-communicable diseases, anaemia was identified as a major cause of morbidity in pregnancy, while asthma and psychiatric morbidity were also thought of as important health problems.

C. Notifiable communicable diseases

From a list of 27 designated communicable diseases for which notification is mandatory, the 10 that had the highest number of cases for the year 2000 are shown in table 6. Some of these diseases showed fluctuations within the period from 1996 to 2000 because there could have been an epidemic for a short period of time or the statistics could have been showing a cyclical pattern over a longer period. For example, there was an outbreak of enterovirus in 1997, when the incidence rate was 27.7 per 100,000 population. There was another outbreak in 2000, but in between, the levels were low.

Dengue and malaria, two mosquito-borne diseases, showed cyclical patterns. Within a five-year period, the number of malaria cases decreased. The

highest incidence of malaria was recorded in the state of Sabah, which constituted 45 per cent of all cases in the country in 2000 (Ministry of Health, 2000, p. 103). In that year, 24 per cent of the cases were in Sarawak and 31 per cent in Peninsular Malaysia.

For HIV/AIDS, the incidence rate should not be taken at face value because mandatory testing is restricted to targeted social groups, and the extent of testing carried out differs from year to year. In any case, it is among the important infectious diseases, and the death rate has been increasing, from 1.28 per 100,000 in 1996 to 2.18 in 1997, 3.11 in 1998, 3.85 in 1999 and 3.97 in 2000.

Although mortality from infectious diseases has fallen over the decades and, as such, these diseases are no longer important causes of mortality, nevertheless they are still very much part of the disease pattern. Diseases such as malaria can contribute to other problems such as anaemia and poor nutritional status, while tuberculosis and sexually transmitted diseases are linked to HIV/AIDS, a problem that is on the rise.

III. UNDERNUTRITION

In many developing countries, undernutrition among children is often an underlying cause of disease and death. In Malaysia, the extreme forms of malnutrition such as kwashiorkor and marasmus are no longer seen, but numerous surveys show the

Table 6. Incidence rate of communicable diseases reported, 1996-2000

	<i>Incidence rate (per 100,000)</i>				
	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>
Tuberculosis (all forms)	61.0	63.1	63.6	65.6	64.7
Malaria	245.4	123.0	60.8	48.9	55.7
Food poisoning	15.3	31.1	31.5	38.0	36.6
Dengue	67.3	89.7	123.5	44.7	32.0
Measles	2.2	2.6	2.2	11.5	27.9
HIV	21.7	18.0	20.9	20.7	23.0
Viral hepatitis (all types) ^a	7.5	3.3	24.4	26.5	18.3
Enterovirus, HFMD ^b	—	27.7	4.2	1.9	13.6
Syphilis (all forms)	7.4	6.1	11.1	9.5	7.7
Gonococcal (all forms)	8.4	6.4	5.9	9.8	6.0

Source: Ministry of Health (2000). *Annual Report 2000* (Kuala Lumpur: Ministry of Health), pp. 92-94.

^a Mostly hepatitis B (12.8 per 100,000).

^b Hand, foot and mouth disease.

continued existence of poor growth achievement among children. On the contrary, overweight is increasing among adults, particularly in adult women. This gives rise to the paradoxical “twin problems of malnutrition”, that is, overnutrition and undernutrition coexisting in the same community.¹⁸ This paper, however, focuses only on child undernutrition, a problem that is closely related to child mortality.

A. National trends

The Ministry of Health carries out nutritional surveillance by monitoring the weight for age of children under five years old who attend government health clinics (Ministry of Health, 2000). From 1991 to 2000, the rate of undernutrition among these children was found to have gradually decreased. In 2000, the prevalence of underweight¹⁹ was 14 per cent. Being a clinic-based sample, this was not representative of the country's population; however, a representative sample at the national level surveyed in 1999 showed comparable rates.

The 1999 survey was based on a stratified random sample from metropolitan, large urban, small urban and rural areas of living quarters representative of the whole country (Ministry of Health, 2001). The weights, heights and ages of all children under five were taken, yielding four indicators: underweight, stunting and wasting (defined respectively as weight for age, height for age and weight for height, each less than minus two standard deviations from the NCHS reference median)²⁰ and overweight (weight for age equal to or more than two standard deviations from the reference median). Severe underweight, stunting and wasting were each defined as less than minus three standard deviations from the NCHS reference median.

In this study, the overall prevalence of stunting, an indicator of long-term undernutrition, was 16 per cent, which is considered a low prevalence according to WHO criteria.²¹ The prevalence of underweight, reflecting current undernutrition, was 19 per cent; although this is a moderate level, it was bordering on high according to WHO criteria.²² Furthermore, the prevalence of severe stunting was found to be 5.3 per cent and severe underweight was 2.7 per cent. Overweight was not considered a public health problem in this age group, because the prevalence of 2.1 per cent was within the statistical limit of 2.5 per cent.

B. Urban/rural and social class differences

Table 7 shows the prevalence of undernutrition among children based on the 1999 Ministry of Health study as well as the nutritional surveillance system for the year 2000, distributed by states, urban-rural strata and family income. Although prevalence of undernutrition was not always consistently the highest in the most rural states, the more rural states may be seen to have generally higher levels of undernutrition compared with the more urban states. For example, Kelantan had the highest (29.9 per cent) prevalence of undernutrition, followed by Perlis (25.2 per cent), Melaka (24.3 per cent), Terengganu (23.4 per cent) and Sabah (22.7 per cent), all of which are more than 50 per cent rural.

Table 8 shows that rural children in the 1999 Ministry of Health study had higher levels of current undernutrition (as shown by the percentage prevalence of underweight) and chronic undernutrition (shown by the percentage prevalence of stunting) when compared with urban children. When the data are disaggregated by family income levels, the difference in prevalence is even wider. Both current as well as chronic undernutrition are twice as high in families with income less than RM 1,000 per month compared with families with income of RM 1,000 or more per month.

¹⁸ For a recent study on this, see Khor and Zalilah (2003).

¹⁹ Defined as weight for age lower than minus two standard deviations from the United States National Center for Health Statistics (NCHS) reference median. WHO is currently developing an international reference, but in the meantime, the NCHS reference is recommended for use in all countries.

²⁰ The term stunting is often used to indicate long-term, or chronic, undernutrition. The term underweight is usually taken to indicate current undernutrition, that is, undernutrition that is occurring at the time the measurement is taken. Wasting is used to denote acute undernutrition, that is, undernutrition that occurred very suddenly and within a short span of time.

²¹ For children under five years of age, less than 20 per cent stunting is defined as low prevalence; 20-29 per cent is moderate; 30-39 per cent high; and 40 per cent and above, very high (WHO, 1995, as cited in Ministry of Health, 2001).

²² WHO defines less than 10 per cent underweight as a low prevalence, 10-19 per cent as medium, 20-29 per cent as high, 30 per cent and above as very high (WHO, 1995, as cited in Ministry of Health, 2001).

Table 7. Prevalence of underweight among children under five years of age

	1999 MOH study ^a			2000 NSS ^b			Percentage rural (1999)
	N	Percentage prevalence Weight for age		N	Percentage prevalence Weight for age		
		<-2SD ^c	<-3SD ^d		<-2SD ^c	<-3SD ^d	
Kuala Lumpur	233	13.7	1.7	—	—	—	—
Selangor	353	14.5	2.0	43,507	15.2	0.5	12
Pulau Pinang	269	15.9	3.3	16,965	14.4	0.9	15
Perak	618	20.7	2.9	27,542	10.9	0.9	34
Johor	725	12.8	1.9	38,191	5.5	0.2	45
Sarawak	522	19.2	2.9	49,631	17.7	1.5	51
Melaka	152	24.3	3.9	12,704	20.9	0.5	51
Negeri Sembilan	183	16.4	0	12,875	13.9	1.3	53
Terengganu	261	23.4	4.6	17,358	15.1	0.9	54
Kedah	364	18.2	1.4	25,719	17.5	0.7	59
Kelantan	337	29.9	5.9	27,728	15.1	1.2	61
Sabah	69	22.7	3.3	33,984	13.8	1.2	62
Perlis	147	25.2	4.8	2,531	14.7	1.3	66
Pahang	338	16.3	2.1	23,805	17.3	1.1	67
Malaysia	5,198	16.3	2.8	332,540	14.0	1.0	42

^a Ministry of Health Study, 1999 (*Ministry of Health, Malaysia's Health 2001*).

^b Nutritional Surveillance System, 2000 (*Ministry of Health, Annual Report 2000*).

^c Less than minus two standard deviations from the United States National Center for Health Statistics (NCHS) reference median; includes those who were less than minus three standard deviations from the NCHS reference median.

^d Less than minus three standard deviations from the NCHS reference median.

Table 8. Distribution of undernutrition in the 1999 Ministry of Health study

	Percentage prevalence			
	Underweight: Weight for age		Stunting: Height for age	
	<-2SD ^a	<-3SD ^b	<-2SD ^a	<-3SD ^b
Children <5 yrs				
(1) Strata				
Rural (N=2,335)	25.9	3.3	24.6	6.0
Urban (N=2,723)	19.0	2.2	18.0	4.8
(2) Family income				
<RM1,000 per month (N=2,706)	28.1	3.6	26.9	6.8
≥RM1,000 per month (N=2,390)	14.3	1.6	14.2	3.7

Source: Ministry of Health Study, 1999 (*Ministry of Health, Malaysia's Health 2001*).

^a Less than minus two standard deviations from the United States National Center for Health Statistics (NCHS) reference median; includes those less than minus three standard deviations from the NCHS reference median.

^b Less than minus three standard deviations from the NCHS reference median.

The 1992-1995 study on rural communities in Peninsular Malaysia also collected data on the nutritional status of children 18 years and younger (Khor and Tee, 1997). The prevalence of undernutrition in that study was generally higher (about a quarter to more than a third) than the rural prevalence measured in the 1999 Ministry of Health study (about a quarter in rural areas) (table 9). Even though the data for the former study were collected a few years earlier than the latter one, the higher preva-

lence rates are more likely due to the difference in representation; while the 1999 Ministry of Health study was representative of the country's population, the 1992-1995 study was designed to be statistically representative of five specific types of rural communities, that is, fishing, rice farming, rubber and coconut villages and rubber estates. Undernutrition was found to be particularly high among children in the villages where fishing, rice cultivation and rubber tapping were dominant economic activities.

Table 9. Distribution of undernutrition in the 1992-1995 UPM-IMR^a study

	<i>Weight for age</i> <i><-2SD^b</i>		<i>Height for age</i> <i><-2SD^b</i>	
Community types (children > 1 up to 6 yrs)	Boys	Girls	Boys	Girls
Fishing	39.7	36.8	34.6	26.9
Rice farming	34.0	39.2	31.7	37.1
Rubber	32.3	37.3	34.6	32.0
Coconut	23.2	27.1	14.3	20.0
Estates	28.6	33.7	12.0	17.6
All	32.6	35.9	28.0	28.8
Community types (children ≤ 18 yrs)	Boys	Girls	Boys	Girls
Fishing	33.3	24.6	38.6	24.8
Rice farming	30.0	28.5	34.1	30.1
Rubber	31.4	27.6	34.9	31.4
Coconut	22.2	19.1	22.2	23.1
Estates	29.5	24.6	20.6	21.9
All	29.8	25.5	31.3	26.9

Source: Universiti Putra Malaysia and Institute for Medical Research Joint Collaborative Study. See Khor G.L. and E.S. Tee (1997). "Nutritional assessment of rural villages and estates in Peninsular Malaysia: II Nutritional status of children aged 18 years and below", *Malaysian Journal of Nutrition*, 3:21-47.

^a Universiti Putra Malaysia and Institute for Medical Research Joint Collaborative Study.

^b Less than minus two standard deviations from the United States National Center for Health Statistics (NCHS) reference median; includes those less than minus three standard deviations from the NCHS reference median.

A follow-up study conducted in 1998 specifically targeted the villages in which the prevalence of child undernutrition had been found to be high (Chee and others, 2002). All children between the ages of 12 and 72 months were included in the study, which was designed to understand the reasons for child undernutrition. Multivariate analysis found that having an income below the poverty level (measured by household income) and not having access to piped water were significant predictors of underweight in children, while mothers having fewer than six years of education was a significant predictor for stunting. The most consistent predictor for child undernutrition was the lack of access to a piped water supply.

IV. GENDER DIFFERENCES

An analysis of mortality rates in Peninsular Malaysia from 1950 to 1978 concluded that the data confirmed higher risks of boys dying in infancy than girls, and that there were no differences in the rate of decline in mortality rates between males and females (Kwok, 1982). The gap in life expectancy at birth between females (75.3 years) and males (70.7 years)²³ is similar to that of developed countries rather than South Asian countries;

²³ Includes non-Malaysian citizens (taken from 2002 life tables) (Department of Statistics, 2003).

during the year 1998 the infant mortality rate for boys (10.6 per 1,000 live births) was higher than that for girls (7.0 per 1,000 live births).

Table 10 summarizes the prevalence of under-nutrition among children from the three previously mentioned surveys. The prevalence of undernutrition tended to be higher among boys. The prevalence by sex disaggregated in the different types of rural communities in the study by the Universiti Putra

Malaysia and the Institute for Medical Research confirms this pattern (see table 9).

The gender disadvantage in health faced by women in other developing countries, particularly most South Asian countries, is not apparent in the health indicators for Malaysia. This is not to say, of course, that gender inequalities do not exist, as women are still disadvantaged in work, income and political leadership indices (UNDP, 2004).

Table 10. Distribution of undernourished children by sex in various studies

	<i>Percentage of children who are undernourished</i>	
	<i>Females</i>	<i>Males</i>
MOH study (1999) ^a	(N = 2,702)	(N = 2,406)
Underweight ^b	18.5	19.4
Stunting ^c	14.4	16.7
Wasting ^d	13.1	13.5
UPM-IMR study (1992-1994) ^e	(N = 2,415)	(N = 2,364)
Underweight ^b	25.5	29.8
Stunting ^c	26.9	31.1
Wasting ^d	8.7	9.3
Family Dynamics study (1997-2001) ^f	(N = 398)	(N = 431)
Underweight ^b	30.2	30.9
Stunting ^c	23.4	21.3
Wasting ^d	8.5	10.7

^a Ministry of Health Study, 1999, carried out by the Family Health Development Division, was a household-based country-wide representative sample of children under five years old (Ministry of Health, 2001).

^b Weight for age less than minus two standard deviations from the United States National Center for Health Statistics (NCHS) reference median.

^c Height for age less than minus two standard deviations from the NCHS reference median.

^d Weight for height less than minus two standard deviations from the NCHS reference median.

^e Universiti Putra Malaysia (UPM) and Institute for Medical Research (IMR) study covered rural communities in Peninsular Malaysia with children aged 18 years and younger (Khor and Tee, 1997).

^f Collaborative study led by Universiti Putra Malaysia, covering subsample of rural communities from the UPM-IMR study chosen for high prevalence of undernutrition among children one to five years old (Chee and others, 2002).

V. INDIGENOUS COMMUNITIES

Various studies have been conducted among the indigenous communities of Sabah, Sarawak and Peninsular Malaysia.²⁴ In the early to mid-1980s, a primary health-care project was conducted in the Baram District of Sarawak, one of the country's

most disadvantaged and isolated areas (Chen and others, 1989a). In 1982, this study calculated an infant mortality rate of 97.8 per 1,000 live births for the Penans in Ulu Baram, which was very high compared with rates of 16.8 for Sarawak and 19.3 for Peninsular Malaysia in the same year. Among children from birth to five years old, 57 per cent were found to be stunted (as a result of chronic undernutrition). Immunization coverage was low; only 22 per cent had received BCG vaccination and 17 per cent had received three doses of vaccination for diphtheria, pertussis and tetanus (DPT). In other

²⁴ For a bibliographic reference on the Sarawak and Sabah studies, see Baer (2001); for Orang Asli studies, see Baer (1999).

areas, chronic undernutrition among Penan children (under six years old) was about 44-47 per cent. The situation of Kenyah children was slightly better compared that of the Penans; 31 per cent were stunted in Ulu Baram in 1982, and immunization coverage was also better.²⁵

In 1987, a similar primary health-care project was started in the Keningau and Pensiangan districts, a poverty-stricken and underserved area in Sabah, which had a combined population of slightly over 50,000 (1980 population census). Nutritional assessment of children aged 0-5 years, conducted in 1987 and 1989, recorded 39-42 per cent stunting. Coverage of BCG immunization, however, was better (98 per cent), but only 41 per cent had received at least three doses of DPT vaccine (Chen and others, 1989b). Studies of other communities in the 1980s also recorded high prevalence of child undernutrition: moderate or severe protein energy malnutrition in 51 per cent of children under six years old in Lubok Antu, 82 per cent of Iban children throughout rural Sarawak, 95-98 per cent of children four to seven years of age in Kapit Division (1981-1983).²⁶

In the 1990s, some improvement has been observed for Sarawak State as a whole, with one study using Health Department data reporting that only 23 per cent of children one to four years of age were underweight in 1995 compared with 33 per cent in 1982 (Duffield and Strickland, 1999 as cited in Baer, forthcoming). At the community level, there is a lack of comparable data between the 1980s and the 1990s, but general levels reported in the 1990s seem to be lower than those reported in the 1980s. For example, data from three rural clinics for the year 1999 showed 16 per cent, 20 per cent and 56 per cent moderate or severe malnutrition among Iban children under five years of age (Baer, forthcoming) compared with the much higher levels referred to in the preceding paragraph.

Goitre, iodine deficiency and anaemia were very widespread in the inland areas of Sabah and Sarawak, and continue to be so. Common

infectious diseases among the rural indigenous communities are malaria, intestinal parasites, scrub typhus, tuberculosis, pneumonia, gastroenteritis and respiratory problems. The nutritional deficiencies are linked to environmental changes because deforestation and logging lead to a decrease in the animals and fish that used to be important protein sources; however, the ecological impact on the spread of infectious diseases has not been fully studied.

VI. CONCLUSION AND RECOMMENDATIONS

At the national level, the MDGs for child mortality and maternal health are on track to being achieved in Malaysia. However, while national, and even state, mortality rates have fallen to very low levels, considerable problems remain in certain sectors of the population. Child and maternal mortality and related health problems are important among indigenous groups, in particular, those affected by logging and land-clearing as well as those who have been resettled. There are, however, no available longitudinal statistics to enable a numerical accounting of the historical trend in maternal and child mortality rates in these communities. Nevertheless, the child and maternal health indicators for these communities are much worse than the national indicators. From a statistical perspective, when the overall mortality rates reach a very low level, they will most likely plateau, and further declines will have to depend on reducing the rates in the communities where they are still relatively high. Most of the attention will therefore have to be given to improving maternal and child health in these disadvantaged communities.

Maternal mortality at the national level is low, as is child mortality, although the rates in Sabah and Sarawak are still considered incomplete and, therefore, unreliable. Problems related to maternal health persist, in spite of official efforts directed at improving this situation. Anaemia and undernutrition are underlying problems in maternal mortality, which needs to be addressed together with the problem of child undernutrition. There are certain unresolved questions that require further research, notably the relatively high infant mortality rates in the capital city of Kuala Lumpur despite the generally lower rates recorded in other urban centres.

²⁵ The study reported that the situation improved after primary health-care intervention. The infant mortality rate dropped from 97.8 to 19.6 per 1,000 among the Penans in Ulu Baram, from 30.8 to 0 for the Kenyahs, and from 114 to 62 for the Penans in Tutoh (Chen and others, 1989).

²⁶ Reviewed in Baer, forthcoming.

The reasons for undernutrition among children have been well established – poverty, low household incomes, food insecurity, low education of mothers, inadequate supply of safe water and poor sanitation. The importance of a safe water supply cannot be overemphasized, and in this context, the loss of forested catchment areas, wasteful leakage of water as a result of bad infrastructure and poor water conservation practices are matters of concern. It is recommended that the Government should conserve water catchment areas and improve and extend water-supply infrastructure.

Child and maternal health problems could also be widespread among the migrant population, but are underresearched. The migrant labour population is about 1 million, but together with undocumented migrants, the total migrant population could be about 2 million. In general, not much research has been

done on the health situation and access to health-care services of the migrant population in Malaysia. This issue is pertinent considering the perception among health workers that the spread of infectious diseases is related to the migrant population.

There are ongoing studies on the social and cultural aspects of HIV/AIDS, but these have yet to be completed. Attention has also been given to malaria, tuberculosis and other infectious diseases. However, there has been a lack of research that examines the infectious disease situation in totality, and in the context of economic development, movements of people and environmental changes. The MDGs may be focused on attaining certain specified numerical benchmarks, but it is in understanding and addressing population health problems in a holistic manner that will bring us further along in achieving them.

References

- Abu Bakar Dato' Suleiman and M. Jegathesan (eds.) (n.d., circa 2000). *Health in Malaysia: Achievements and Challenges* (Kuala Lumpur, Ministry of Health Malaysia, Planning and Development Division).
- Antrobus, Peggy (2003). "Presentation to working group on the MDGs and gender equality", UNDP Caribbean Regional Millennium Development Goals (MDGs) Conference, Barbados, 7-9 July.
- Baer, Adela (1999). *Health, Disease and Survival: A Biomedical and General Analysis of the Orang Asli of Malaysia* (Kuala Lumpur, Centre for Orang Asli Concerns).
- Baer, Adela (2001). *Borneo Biomedical Bibliography* (Kuching, Malaysia: Institute of East Asian Studies, Universiti Malaysia Sarawak (UNIMAS)), accessed on 1 September 2004, <<http://www.unimas.my/research/ieas/pdf/adelab.pdf>>, [formerly published by Baer, A. and G.N. Appell (1996), in *Borneo Research Bulletin*, vol. 27, pp. 77-89, updated in 2001].
- Baer, Adela (forthcoming). "Rural Iban health: The good, the bad, and the background", unpublished manuscript.
- Butz, William P., Julie DaVanzo and Jean-Pierre Habicht (1982). *Biological and Behavioural Influences on the Mortality of Malaysian Infants*, Rand Note N-1638-AID (Santa Monica, California, Rand Corporation).
- Chee Heng Leng (1990). *Health and Health Care in Malaysia: Present Trends and Implications for the Future*, Institute for Advanced Studies Monograph Series, SM No. 3 (Kuala Lumpur, Institute for Advanced Studies, University of Malaya).
- Chee Heng Leng, Khor Geok Lin, Fatimah Arshad, Wan Abdul Manan Wan Muda, Poh Bee Koon, Nik Shanita Safii, Norimah Abdul Karim, Normah Hashim, Mohd Nasir Mohd Taib, Rokiah Talib and Norlela Md Husin (2002). "Nutritional assessment of pre-school children in rural villages of the Family Dynamics, Lifestyles and Nutrition Study (1997-2001): II Prevalence of undernutrition and relationship to household socio-economic indicators", *Malaysian Journal of Nutrition*, vol. 8, No. 1, pp. 33-53.
- Chen P.C.Y., S.T. Chen, S. Hardin, Andrew Kiyu, Yap Sim Bee (1989a). *Primary Health Care among the Orang Ulu of Sarawak, Malaysia* (Kuala Lumpur, Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya).
- Chen S.T., P.C.Y. Chen, M.K.C. Chan, H.A. Rahman, M.L. Wong (1989b). *Primary Health Care in Keningau, Sabah, Malaysia* (Kuala Lumpur, Department of Paediatrics, Faculty of Medicine, University of Malaya).
- DaVanzo, Julie (1984). "A household survey of child mortality determinants in Malaysia", *Population and Development Review, Supplement*, vol. 10, pp. 307-322.
- DaVanzo, Julie and Jean-Pierre Habicht (1984). *What Accounts for the Decline in Infant Mortality in Peninsular Malaysia, 1946-1975?*, a Rand Note (N-2166-WB/RF/FF) (Santa Monica, California, Rand Corporation).
- DaVanzo, Julie and Jean-Pierre Habicht (1985). *Infant Mortality Decline in Malaysia, 1946-75: The Roles of Changes in Variables and Changes in the Structure of Relationships*, Working Draft No. ED-2762-WB/RF/FF (Santa Monica, California, Rand Corporation).
- Department of Statistics Malaysia (various years). *Vital Statistics Malaysia* (Kuala Lumpur, Department of Statistics, Malaysia).
- Department of Statistics Malaysia (1991). *Vital Statistics Time Series Peninsular Malaysia 1911-1985* (Kuala Lumpur, Department of Statistics, Malaysia).

- Department of Statistics Malaysia (1995). *Vital Statistics Malaysia (Special Release) 1991-1993* (Kuala Lumpur, Department of Statistics, Malaysia).
- Department of Statistics Malaysia (1997). *Abridged Life Tables 1991-1996 Malaysia* (Kuala Lumpur, Department of Statistics, Malaysia).
- Department of Statistics Malaysia (1999). *Abridged Life Tables 1996-1998 Malaysia* (Kuala Lumpur, Department of Statistics, Malaysia).
- Department of Statistics Malaysia (2000). *Vital Statistics Malaysia (Special Edition)* (Kuala Lumpur, Department of Statistics, Malaysia).
- Department of Statistics Malaysia (2002). *Yearbook of Statistics 2002* (Kuala Lumpur, Department of Statistics, Malaysia).
- Department of Statistics Malaysia (2003). *Abridged Life Tables 2000-2002 Malaysia* (Kuala Lumpur, Department of Statistics, Malaysia).
- Duffield, A. and S.S. Strickland (1999). "Nutrition in Sarawak: Its relationship to development", in V. King, ed., *Rural Development and Social Science Research: Case Studies from Borneo* (Phillips, Maine, Borneo Research Council).
- Fernandes, B.M. (1988). "Sex differentials in mortality, Peninsular Malaysia, 1947-1980", *Quarterly Review of Malaysian Population Statistics*, No. 11, pp. 11-17.
- Khor, G.L. and Zalilah Mohd Sharif (2003). "Dual forms of malnutrition in the same households in Malaysia – A case study among Malay rural households", *Asia Pacific Journal of Clinical Nutrition*, vol. 12, No. 4, pp. 427-438.
- Khor G.L. and E.S. Tee (1997). "Nutritional assessment of rural villages and estates in Peninsular Malaysia: II Nutritional status of children aged 18 years and below", *Malaysian Journal of Nutrition*, vol. 3, pp. 21-47.
- Kwok Kwan Kit (1982). "Trends and differentials in infant mortality in Malaysia", in *Mortality in South and Southeast Asia: A Review of Changing Trends and Patterns 1950-75* (Manila, WHO/ESCAP).
- Maimunah, Hamid, Narimah Awini, Rugayah Hj Bakri, Tahir Aris, Sondi Sararaks, Azman Abu Bakar, Rozita Halina Tun Hussein and Ong Moh Lim (1998). "The scope and methodology of the survey", in *National Health and Morbidity Survey 1996, Volume 1* (Kuala Lumpur, Public Health Institute, Ministry of Health Malaysia).
- Ministry of Health (1996). *Malaysia's Health 1996: Technical Report of the Director-General of Health Malaysia* (Kuala Lumpur, Ministry of Health).
- Ministry of Health (2000). *Annual Report 2000* (Kuala Lumpur, Ministry of Health).
- Ministry of Health (2001). *Malaysia's Health 2001: Technical Report of the Director-General of Health Malaysia* (Kuala Lumpur, Ministry of Health).
- Rajakumar, M.K., Abu Bakar Suleiman, Lee Choong Hing, Molly Cheah and Yeoh Poh Hong (1980). *The Future of the Health Services in Malaysia. A Report of a Committee of Council of the Malaysian Medical Association* (Kuala Lumpur, Malaysian Medical Association).
- Tan Poo Chang, Kwok Kwan Kit, Tan Boon Aun, Shyamala Nagaraj, Tey Nai Peng and Siti Norazah Zulkifli (1987). "Socio-economic development and mortality patterns and trends in Malaysia", *Asia-Pacific Population Journal*, vol. 2, No. 1, pp. 3-20.
- United Nations (n.d.). "Millennium Development Goals", accessed on 12 March 2004, <http://www.who.int/mdg/goals/MDGsList_smartformat.pdf>.
- United Nations (1993). *Studies on Consequences of Population Change in Asia: Malaysia*, Asian Population Studies Series No. 118 (New York, ESCAP).

United Nations Department of Public Information (UNDPI) (2004). Millennium Development Goals: Status 2004, DPI/2363-A.

United Nations Development Programme (UNDP) (2004). *Cultural Liberty in Today's Diverse World, Human Development Report 2004*,

accessed on 6 August 2004 <<http://hdr.undp.org/reports/global/2004/>>.

Vandemoortele, Jan (2002). "Are the MDGs feasible?" United Nations Development Programme (UNDP) Bureau for Development Policy (New York, UNDP).

Chapter VIII

Trends and Emerging Issues of Health and Mortality in the Islamic Republic of Iran

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Until the late 1940s, the population of the Islamic Republic of Iran had been growing at a very low rate (Bharier, 1968). The first national population and housing census conducted in 1956 revealed a population of 18.9 million with an average annual population growth rate of 1.7 per cent (Amani, 1968; Maroufi Bozorgi, 1967). Ten years later, according to the 1966 census, the size of the Iranian population had risen to about 25.8 million, which implies an average intercensal growth rate of 3.1 per cent per year (Bulatao and Richardson, 1994). After a decade of implementing a family planning programme in the period 1967-1976, the third national census taken in 1976 revealed an average annual intercensal growth rate of 2.7 per cent. However, the country's population grew very rapidly, at 3.9 per cent annually, during the period 1976-1986 mainly as a result of the pronatalist policy adopted after the 1979 revolution. By 1996, the Iranian population had reached 60 million (Statistical Centre of Iran, 1996).

Studies have shown that mortality decline has been the main factor behind the demographic transition in the Islamic Republic of Iran during the twentieth century (Saraie, 1998; 2000; Mirzaie, 1998). This was mainly due to the development initiatives of the Pahlavi regime during the 1960s; these were implemented under what were called

“White Revolution” programmes. Mortality declined from 40 per 1,000 in 1900 to about 20 per 1,000 during the 1960s and 1970s (Amani, 1996). However, in the pre-revolutionary period, the level of mortality was high and there was a considerable gap between urban and rural areas.

The rise in the birth rate during the period 1976-1984 and the subsequent fall in the birth rate in the period 1985-2000 contributed to the demographic transition in the Islamic Republic of Iran. The total fertility rate increased to about 7.0 births per woman in 1979/1980, and then started to decline by the mid-1980s. There was a sharp fertility decline during the 1990s, and the total fertility rate decreased to the replacement level by the year 2000 (Abbasi-Shavazi, 2000; 2001; 2002). As a result of the change in the age structure of the population brought about by the rapid decline in fertility, the demand for education, health and other social needs, including employment, has increased. As the very large post-revolutionary birth cohort passes through the childbearing years, there may be a rise in the number of births ensuing from the baby boom generation's echo effect. This will in turn have many policy implications for the Iranian Government.

In the following section, we briefly describe socio-economic changes as well as the improvements in the health network system in the post-revolutionary period.

I. RURAL DEVELOPMENT AND THE EXPANSION OF THE HEALTH NETWORK SYSTEM

In 1956, about 69 per cent of the Iranian population lived in rural areas, but the figure declined to 62 per cent in 1966, to 53 per cent in

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1976 and to 43 and 39 per cent in 1986 and 1996 respectively (Statistical Centre of Iran, various years). Thus, the majority of the population (61 per cent) is now living in urban areas.

With rapid urbanization, the majority of the people have better access to health facilities in urban areas; as a result, mortality has declined. By contrast major changes have occurred in the rural areas of the Islamic Republic of Iran. Rural development initiatives after the 1979 revolution were aimed at improving conditions in rural areas and reducing the pre-revolutionary inequalities between rural and urban areas. A number of development projects were implemented to accomplish this goal. Soon after the revolution, the Construction Crusade Organization or *Jihad-e Sazandegi* was established to revive and develop the cultural, economic and social conditions of the rural and underdeveloped areas. The activities of this organization ranged from providing educational and health services to constructing roads and irrigation pools, extending the supply of drinking water, establishing the electricity network and distributing agricultural machinery and equipment. These activities contributed to the establishment of a sound and healthy rural environment after the revolution, and made rural areas of the Islamic Republic of Iran significantly different from those of other countries in the Central Asian subregion. By 1996, the majority of rural communities had access to primary health services (95 per cent), piped water (86 per cent), electricity (95 per cent), television (68.5 per cent) and radio (88 per cent) (Abbasi-Shavazi and others, 2002; Ministry of Health and Medical Education (MOHME), 2002). Such developmental processes facilitated the success of health programmes in general, but particularly in rural areas.

In addition, one of the important achievements of the Islamic Republic of Iran has been the expansion of the health network system. For the majority of the people, the health system during the 1940s and 1950s was very remote; most people in rural areas of the country did not have access to health services. A number of health projects, including the Malaria Reduction Project, were carried out to eliminate the main sources of infectious diseases during the late 1940s and 1950s. During the 1960s and 1970s, various attempts were made to modernize the country and reduce the inequality between rural and urban areas. Under the White Revolution, the Health Corps (*Sepaheyan-e Behdasht*) and the Literacy Corps (*Sepaheyan-e*

Danesh) were employed and sent to rural and deprived areas of the country to improve the literacy and health levels of rural areas. That regime had also planned to establish a health network system throughout the country. West Azarbaijan Province was selected as the pre-test area; the aim was to expand the system throughout the country, although the project was not implemented before the revolution. Another initiative towards health improvement of the deprived regions and rural areas of the country was the employment of foreign medical doctors and practitioners from countries such as India, Bangladesh, the Philippines and Pakistan. These were sent to remote areas to provide services to rural people. This plan was continued until the late 1980s. However, by the late 1980s there was a surplus of medical doctors graduated from both government and private universities. The Government discontinued the programme for employing medical doctors from foreign countries and terminated the contracts of those who were already working in rural and underdeveloped areas.

In 1981, the Ministry of Health implemented the health network system that had been planned by the previous regime. The aim was to expand primary health-care services to people in the rural and deprived areas. By 2003, there were 15,394 health houses or health clinics (*khanah-e Behdasht*) throughout the country. Each health house, which is the most peripheral rural health facility in the network, provides services to about 1,500 people in the villages as well as surrounding satellite villages. Health houses follow an integrated health approach in rural areas. The main functions of a well-established health house include taking an annual census of the population covered, educating the public about health matters, providing family planning and reproductive health services, offering case findings and disease-control services and promoting environmental health as well as collecting, recording, storing and periodically reporting health information (Mehryar, 1996; 1997). Currently, the health houses cover more than 95 per cent of the rural population in the country. In addition to the village health houses, there are health centres at the district level as well as in urban areas. Health houses are usually supervised by rural health centres, situated in the same rural district, which are staffed by a general practitioner, several health technicians and administrative personnel. Urban health centers, which are similar to rural health centres, service about 12,000 people and provide ambulatory curative services.

The establishment of the health network system and the extension of it to the rural and deprived areas in the country have been among of the key factors in the improvement of health in general and in the reduction of infant mortality rates in particular.

II. SOURCE OF MORTALITY DATA

This section describes the main sources of data needed in the analysis of health and mortality trends, together with an assessment of the quality of data. The health improvements and the reduction of mortality are discussed thereafter. Mortality statistics in the Islamic Republic of Iran are collected mainly by three official sources, the Civil Registration Organization (CRO), the Statistical Centre of Iran (SCI) and the Ministry of Health and Medical Education. CRO is officially responsible for the timely collection of vital statistics, particularly births and deaths. However, studies have shown that death registration is far from complete (Zanjani, 1991; Zanjani and Koosehshi, 1992; Amirkhosravi, 1994; Amani, 1996). SCI also conducts decennial population censuses, but the data and information on mortality have been collected only in the last two censuses conducted in 1986 and 1996 (Mehryar and Malekpour, 1994). The Health Ministry collects and publishes morbidity and mortality statistics as a means of evaluating the impact of its health projects. Despite the fact that various organizations collect data on mortality, information on death and causes of death are far from complete. For this reason, mortality figures have always been based on indirect estimations drawn from census or vital registration data.

Information on causes of death is vital for monitoring the health, morbidity and mortality situation in any population. Despite its importance, however, CRO has not been able to collect the data necessary on causes of death for the following reasons. First, registration of death with accurate causes can have some legal and financial consequences for the family of the deceased. Second, diagnosis, registration, data-gathering, classification and information analysis about causes of death require an intersectoral effort across government organizations and institutions such as the aforementioned Health Ministry and CRO, the Medical Community Organization and the Forensic Medicine Bureau. Municipalities also engage in this effort.

In order to increase the coverage of timely registration of death and to collect data on the causes of death, the Death Registration Project was implemented in 1998 in collaboration with CRO, the Ministry (through district hospitals, health houses, health volunteers, the Forensic Medicine Bureau) and authorized cemeteries. The objectives of the project are to:

- Organize intersectoral cooperation among different responsible sectors at the district, provincial and national levels for managing the statistical death registration system;
- Establish the statistical death registration system and collect mortality data according to cause of death in terms of age, sex, region, district and province;
- Identify an approved and scientific model for monitoring the health situation, examine factors affecting the society's health and prioritize programmes according to the importance of each cause through calculation of the disease burden and related dangerous factors;
- Make continuous improvements in the diagnosis, registration, classification, collection and analysis of death data;
- Identify strengths and weaknesses of the project to further improve the data-collection system.

The project was aimed at covering the entire population, although initially it was implemented only in Booshehr Province; in 1999, it was expanded to three other provinces. In 2000, six other provinces were added to the project and by 2001 the project was implemented in 18 out of the 30 provinces in the Islamic Republic of Iran, thus covering about 37 million of the country's total population. The Government plans to expand the project throughout the country by 2005.

As part of this project, CRO is responsible for the timely recording of all deaths. Hospitals, cemeteries and rural councils as well as health houses were expected to complete unified forms and questionnaires related to the deceased and report the information gathered to the provincial committee of the project. If a death does not occur

in a hospital and the cause of death is not clear, a team from the health department, including a general practitioner and health official, identify and report the cause of death. The data are collected, compared and evaluated at the district health centre, and after omitting repeated cases, the defective and non-reliable cases are corrected through contact with the reporting sources. Information sought on a death includes the deceased's name, age, sex, place of residence, and cause and date of death. The collected data are then sent to provincial health centres where data entry occurs, using death registration software especially designed for this purpose. The software compares entered cases and deletes repeated ones after verification. This thorough procedure has improved data quality from the time of the initial phase of the project. The results of the project have been published separately for each phase (Naghavi, 2000; 2001; 2003). This paper uses the published information on causes of deaths based on the Death Registration Project in 18 provinces of the Islamic Republic of Iran.

In addition, some of the estimates on infant and child mortality in this paper are drawn from the Iran Demographic and Health Survey (DHS). The Health Ministry conducted the DHS in 2000 in collaboration with SCI, CRO, UNFPA and UNICEF. The survey covered about 114,000 households throughout the country and collected information on mortality as well as other demographic and health issues.

III. MORTALITY LEVELS AND TRENDS

Mortality in the Islamic Republic of Iran had been very high during the 1900s and the first half of the twentieth century. However, a substantial mortality decline has occurred in recent decades. Although the level of mortality during the late nineteenth century is unknown, estimates show that the crude death rate had been as high as 36 to 40 per 1,000 between 1880 and 1900 (Saraie, 1998; Amani, 1996). During the early twentieth century, mortality declined, albeit at a very slow pace. Amani (1996) showed that the crude death rate declined from about 36 per 1,000 during the period 1896-1901 to about 32 per 1,000 during the period 1926-1931, and then to about 24 per 1,000 during the period 1951-1956.

As mentioned previously, a number of health projects, including the Malaria Reduction Project, were carried out to eliminate the main sources of infectious diseases during the late 1940s and 1950s. During the 1960s and 1970s, as part of the White Revolution, members of the Health Corps were sent to rural and remote areas to put in place programmes to improve the health of the people. In addition, the first official family planning programme was started in 1966 and remained effective until the 1979 revolution. These programmes have contributed to the improvement of health and the reduction of mortality during the 1960s and 1970s. Consequently, mortality declined at a faster pace during this period as compared with the first half of the twentieth century. The level of mortality declined from 24 per 1,000 in the 1950s to about 14 per 1,000 and then to about 10 per 1,000 during the period 1986-1990 (Amani, 1996).

The mortality statistics published by organizations such as the Health Ministry, SCI and CRO were not always in agreement. Recently, the Committee for Unifying Mortality Statistics was established. After reviewing the estimates from various organizations, the Committee announced that the crude death rate (CDR) for 2001 was 5.87 per 1,000 (Statistical Centre of Iran, 2004). However, statistics derived from the Health Ministry for that year indicate that the rate was not higher than 5.0. Given the young structure of the population and the improvements in health status, for the national level CDR would not likely be higher than the figure accepted by the Committee.

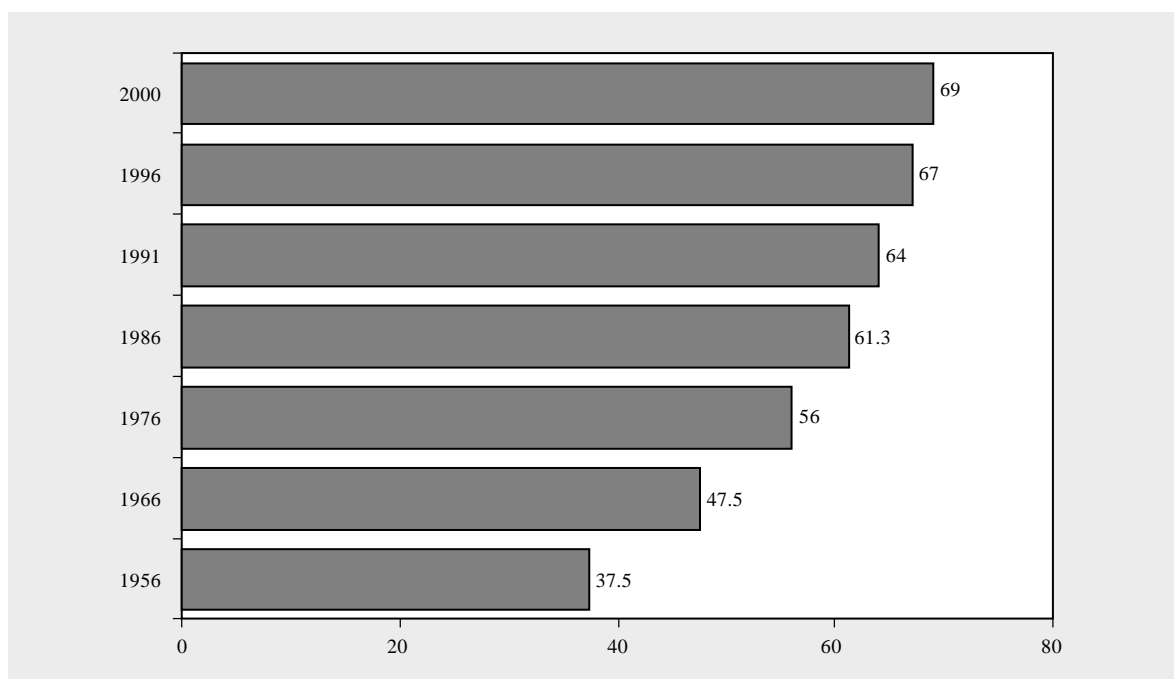
The acceleration in the pace of mortality decline in recent decades is due to the reduction in under-five mortality and declining deaths caused by infectious diseases, as a result of the improvements in the health network system and increasing rural development in the post-revolutionary period. The young structure of the population in the Islamic Republic of Iran is also another factor bringing CDR to low levels.

Along with these changes, considerable gains have been observed in life expectancy at birth. Although there are no statistics for mortality during the early 1900s, scholars have estimated that life expectancy at birth was around 25 years in the period 1900-1920, which gradually increased to around 40 years in the 1940s and 1950s (Saraie,

1998; Amani, 1996). The results of the 1966 census showed that life expectancy had increased to 47 years in the period 1956-1966, and to 56 years in the period 1966-1976. The increase in life expectancy was pronounced during the last two decades because of the improvements in health

conditions and the reductions in infant and child mortality. Studies showed that life expectancy at birth climbed to 61 years by 1986 and then to 67 and 69 years by 1996 and 2000, respectively (figure 1) (Mirzaie, 1998; Zanjani and Nourollahi, 2000; MOHME, 2002).

Figure 1. Life expectancy at birth for both sexes, Islamic Republic of Iran, 1956-2000



Source: Figures for 1956, 1966 and 1976 obtained from M. Mirzaie (1998). "Swings in fertility limitation in Iran", Working Paper in Demography, No. 82, Canberra, Australian National University; figures for 1986 and 1991 were obtained from H. Zanjani and M. Koosheshi (1992). *Study of Mortality in Iran* (Tehran: Urban Planning and Architecture Research Centre); and figures for 1986 and 1991 were obtained from the Ministry of Health and Medical Education (2002). *Iran Demographic and Health Survey* (Tehran: MOHME).

There is a two-year gap between the life expectancy for males and for females. In 1996, life expectancy for females was estimated to be 68.4 years while that of males was 66.1 years. There was also a gap between the life expectancy for males and females in rural and urban areas. Despite the improvement in health conditions in rural areas, male and female life expectancy was lower for those in disadvantaged areas compared with those living in urban areas. In 1996, the life expectancy for males and females in urban areas ranged from 67.4 to 70 years, while the figures for those in rural areas were about 65 and 66, respectively (Zanjani and Noorollahi, 2000).

There were also provincial variations in life expectancy, which may be attributed to the

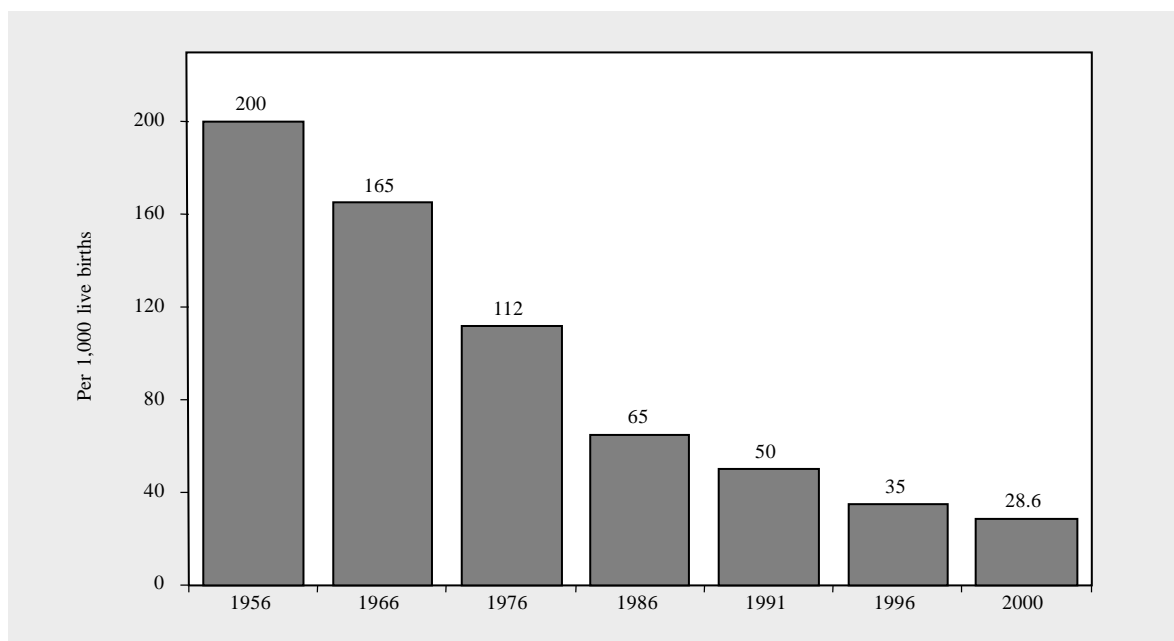
level of socio-economic development in the provinces. Sistan Baluchistan Province, which is one of the least developed provinces in the country, recorded the lowest life expectancy for males (60.7 years), females (62.2 years) and both sexes (61.5 years). Kohgiluyeh-Booir Ahmad, Ilam and Kosdestan should also be added to the list of provinces with lower life expectancies than others. On the contrary, such provinces as Isfahan, Tehran and Gilan enjoyed the highest life expectancies (above 68 years for both sexes) in 1996. These provinces are among the most developed in the country. Therefore, the health system should take into account provincial variations, and priority should be given to the remote provinces in terms of health policy formulation and implementation.

A. Infant and child mortality

Considerable improvement has been made in infant and child mortality rates in the Islamic Republic of Iran during the twentieth century. Evidence suggests that infant mortality was around 305 per 1,000 live births in the period 1900-1920, but gradually declined during the first half of the twentieth century, falling to 256 per 1,000 live births in the period 1920-1940, and to 201 per 1,000 live births in the period 1940-1956 (Sariae, 1998, p. 56). Substantial declines in infant and child mortality rates were recorded in 1956 and 1976 owing to the implementation of development programmes under the regime in power during that period.

Based on the Population Growth Survey conducted in the period 1973-1976, Aghajanian (1993) showed that infant mortality was about 112 deaths per 1,000 live births while the rates for urban and rural areas were 76 and 130 deaths per 1,000 live births respectively. The rate calculated from the Iran Fertility Survey for the same period was 121 deaths per 1,000 live births, slightly higher than the rates based on the Population Growth Survey. The decline in infant mortality rates during the last two decades has been phenomenal. Recent statistics show that the rate decreased from 65 deaths per 1,000 live births in 1986 to around 29 deaths per 1,000 live births in 2000 (figure 2).

Figure 2. Trends in infant mortality rate, Islamic Republic of Iran, 1956-2000



Sources: Figures from 1956 to 1996 were obtained from M. Mirzaie (1998). "Swings in fertility limitation in Iran", Working Paper in Demography, No. 82, Canberra, Australian National University; and figures for 2000 were obtained from Ministry of Health and Medical Education (2002). *Iran Demographic and Health Survey* (Tehran: MOHME).

Several factors have contributed to the sharp decline in the infant mortality rate in recent decades. As mentioned previously, the increasing level of urbanization, the expansion of the health network system along with the increasing level of education and access to electricity and piped water have made the situation in rural areas of the Islamic Republic of Iran more favourable to the decline than in earlier periods. In 1996, around 58 per cent of the rural

areas had access to electricity and around 87 per cent had access to piped water (Abbasi-Shavazi, 2000). The level of literacy in both rural and urban areas also increased sharply during the last two decades. For example, in 1976, around 75 per cent of women aged 15-19 years in urban areas and around 20 per cent of those in rural areas were literate. The figures increased to around 97 per cent and 85 per cent respectively in 1996 (table 1). The

results of a multivariate analysis by Zanjani and Koosheshi (1992, p. 123) using 1986 census data showed that factors such as female literacy rate, access to piped water and percentage employed in agriculture were the main factors determining life expectancy in rural areas. The impact of female literacy was much higher than that of other variables. In addition, owing to the increase in the

coverage of vaccination, the prevalence of diarrhoea and respiratory tract infections has decreased. The improvement in child survival has been very important in the reduction of demand for children, which has contributed to the success of family planning programmes and the reduction in fertility in recent years. The fertility decline has also contributed to the improvement of maternal and child health.

Table 1. Literacy rate for women in the age groups 15-19 to 25-29 in the Islamic Republic of Iran, by rural and urban areas, 1966-1996

Age groups	1966		1976		1986		1996	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
15-19	57.7	5.4	75.4	19.8	85.8	53.0	96.9	86.4
20-24	41.2	2.7	59.4	10.1	75.8	36.5	93.8	77.9
25-29	29.5	1.4	49.4	4.9	65.5	22.0	89.5	65.4

Sources: Statistical Centre of Iran (various years). *Census on Population and Housing* (Tehran: SCI).

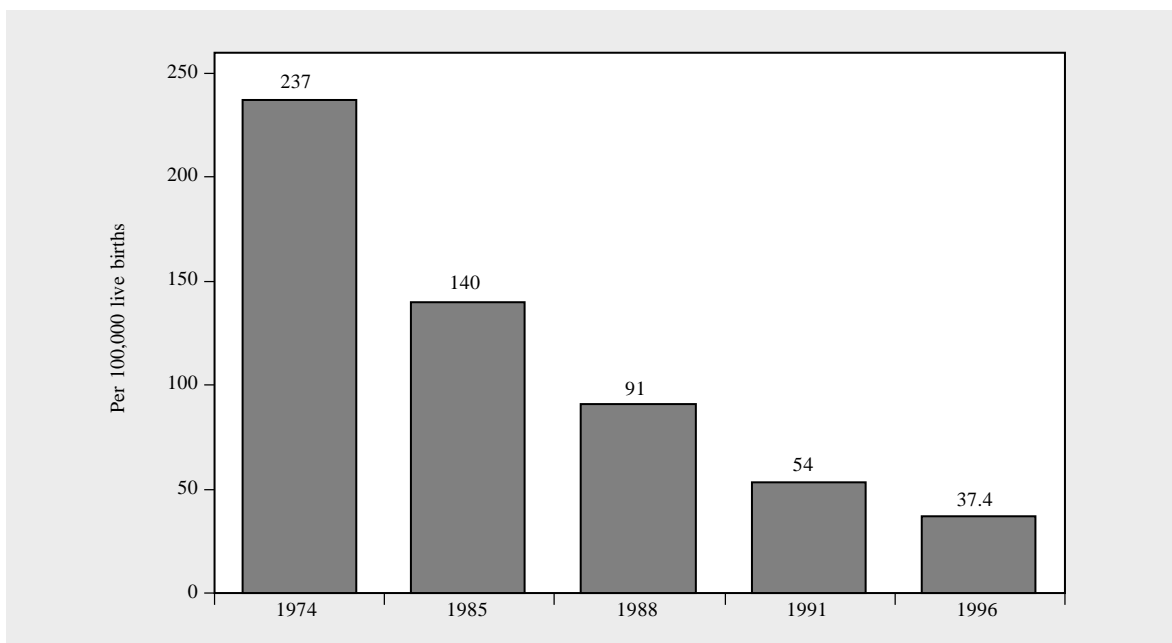
Despite the improvement in child survival, substantial differences exist in the level of infant mortality between rural and urban areas as well as across provinces in the Islamic Republic of Iran. For example, DHS (MOHME, 2002) showed that infant mortality for rural areas (30 deaths per 1,000 live births) was higher than that of urban areas (28 deaths per 1,000 live births). Sistan and Baluchistan provinces recorded the highest infant mortality rates, while Tehran, Gilan and Isfahan enjoyed the lowest such rates in the country. According to Health Ministry statistics (unpublished report), infant mortality rates in rural areas of the provinces covered by the health system declined significantly in 2003, but the figures ranged between 10 deaths per 1,000 live births in Tehran Province and 33 per 1,000 live births in Sistan and Baluchistan provinces. The rates were also high in provinces such as Lorestan (31 per 1,000 live births), Kordestan (29 per 1,000 live births), Kerman (29 per 1,000 live births) and Hormozgan (27 per 1,000 live births).

Provincial as well as rural-urban variations in health status call for further investigation and improvements. It should be noted that, despite the vast improvement in the health network system during the 1980s and 1990s, health houses in rural areas are facing serious challenges in the maintenance of their services.

With the large flow of rural-to-urban migration during the last two decades, many people have left rural areas seeking a better life, including better health care and education, in urban areas. The Ministries of Health and Education and other organizations responsible for rural development planning are not as active and supportive as they were during the 1980s, and this has had a considerable impact on the health of the people who are still living in rural areas. Furthermore, little is known about the health of minority groups; thus, further research in these areas is needed.

B. Maternal mortality

Figure 3 also shows the trends in maternal mortality from 1974 to 1996. There has been a remarkable drop in the maternal mortality ratio from around 237 deaths per 100,000 live births in 1974 to 140 per 100,000 live births in 1985. A significant decline in maternal mortality also occurred during the subsequent decade, 1986-1996, falling to 91 deaths per 100,000 live births in 1988, to 54 per 100,000 live births in 1991 and then to 37.4 per 100,000 live births (54.5 in rural areas and 24 in urban areas) in 1996 (Mehryar and Malekpour, 1994; and MOHME, 2002).

Figure 3. Trends in maternal mortality, Islamic Republic of Iran, 1974-1996

Sources: A. Mehryar and M. Malekpour (1994). *Changing Pattern of Mortality in Iran: A Review of Available Evidence* (Tehran Institute for Research in Planning and Development); and Ministry of Health and Medical Education (2002). *Iran Demographic and Health Survey* (Tehran: MOHME).

It should be mentioned that the maternal mortality ratio has always been estimated by indirect methods. However, in 1996, at the request and expense of the Health Ministry, the Statistical Centre of Iran included a question in the post-enumeration survey administered to households with the aim of identifying women aged 15-49 who had died. Following the census, the Health Ministry conducted a follow-up survey and re-interviewed the households that reported a woman aged 15-49 as having died in the census period in order to identify whether that death had been due to a complication of pregnancy, the delivery of a child, or other medical problem. The figure for 1996 is, therefore, a direct calculation based on a national survey covering all dead women. Recent data collected through the National Maternal Mortality Surveillance System under the Health Ministry indicates that in 2003 only 332 cases of maternal mortality had been reported (Department of Family Health and Population, 2004). The estimates for the number of births ranged between 1,172,000 and 1,300,000. Thus, with either of these figures, the maternal mortality ratio for the Islamic Republic of Iran for the year 2003 is estimated to be between 25.5 and 28.3 deaths per 100,000 live births.

The phenomenal decline in maternal mortality during the decade 1985-1996 was due to the tremendous improvements in maternal and child health care in the Islamic Republic of Iran. According to the DHS, in 2000 more than 90 per cent of deliveries occurred in hospitals or clinics. With the increase in female education, women were more likely to be concerned about having safe pregnancies and deliveries. The other reason for the reduction in maternal mortality was the sharp fall in fertility in recent years. Studies have shown that the total fertility rate for Iranian women in both urban and rural areas declined from 7.0 children per woman in 1979 to the replacement level (about 2.1 children per woman) in 2000 (Abbasi-Shavazi, 2000; 2001; 2002).

Despite the high percentage of deliveries occurring in hospitals (75 per cent in rural areas and 95 per cent in urban areas), statistics show that around 63 per cent of maternal mortality is due to the low quality of care provided in hospitals, including inappropriate, inefficient or mistimed care.

C. Mortality by causes of death

As the major causes of death shift from communicable diseases to non-communicable conditions during the mortality transition, major risk factors shift from those originating from poverty and underdevelopment to conditions associated with lifestyle and the environment (Choe, 2004). In this section, using various data mentioned previously, mortality by causes of death in the Islamic Republic of Iran is analysed.

There is insufficient data on mortality by causes of death to facilitate the study of the course of the mortality transition during the early twentieth century. However, in view of the high mortality and particularly high infant mortality rates it can be concluded that socio-economic and health conditions during the early twentieth century were characterized by a high incidence of death from infectious diseases. It is for this reason that a national pesticide campaign was launched during the 1940s and 1950s to reduce the number of deaths resulting from pest-borne infectious diseases.

Until recently, no comprehensive study has been undertaken at the national level on the causes of death in recent decades. However, a few studies have been conducted at the provincial and regional levels. For example, in a study of the mortality situation in greater Tehran in 1977, Farahani and Kazemipour (1977) found that diseases of the circulatory system (26.9 per cent), respiratory diseases (12.7 per cent) and internal, infectious and parasitic diseases (11.9 per cent), followed by neonatal diseases (10.4 per cent) were the main causes of death. Accidents, poisoning and suicide comprised only 9.2 per cent of the deaths at that time.

The data collected by the previously mentioned Death Registration Project enabled the examination of mortality by causes of death and such demographic characteristics as age, sex and residence. The results presented in this section are based on the findings of the data collected in 18 provinces of the Islamic Republic of Iran, the population of which was 36 million in 2000.

Table 2 shows the distribution of total deaths by cause for urban and rural areas as well as for males and females in 2000. WHO's *International Statistical Classification of Diseases and Related Health Problems* (ICD-10) was used for defining the causes of death under 20 main categories; data on about 130 specific causes of death were collected. The results show that the majority of deaths may be explained by seven causes as shown in the table, while the rest (34 per cent) were categorized as other causes, which will be explained later in this section. As can be seen from the table, cardiovascular diseases (35 per cent), followed by accidents (12 per cent) and cancer (11 per cent) are the three main causes of death. Deaths from prenatal diseases also contribute to around 4.5 per cent of the total deaths in the Islamic Republic of Iran. However, the rates for suicide (1.5 per cent) and violence (1.0 per cent) are also notable. Infectious diseases are far less important as a cause of death (1.7 per cent), indicating that the mortality transition from high to low levels of mortality has occurred with the shift towards non-communicable diseases. "Other causes" are responsible for 34 per cent of deaths, but owing to the limitations of space they are not presented in the table. These causes include congenital malfunction and chromosomal abnormality, respiratory diseases, symptom signs

Table 2. Percentage of total deaths, by cause, area and sex, in 18 provinces of the Islamic Republic of Iran, 2000

Area and sex	Cardio-vascular diseases	Cancers	Accidents	Prenatal causes	Suicide	Infectious diseases	Violence	Other	Total
Total	34.8	10.7	12.0	4.4	1.5	1.7	1.0	33.9	100.0
Rural	33.8	11.7	12.4	4.5	1.9	1.6	1.2	32.8	100.0
Urban	35.4	10.0	11.8	4.3	1.3	1.7	0.9	34.6	100.0
Males	33.1	11.2	15.7	4.2	1.3	1.6	1.5	31.5	100.0
Females	37.5	10.0	7.0	4.2	1.9	1.8	0.3	37.3	100.0

Source: M. Naghavi (2003). *Situation of Mortality in 18 Provinces of Iran* (Tehran: Ministry of Health and Medical Education).

Note: The provinces included in the project are as follows: Markazi, Isfahan, Ilam, West Azarbaijan, Booshehr, East Azarbaijan, Fars, Kerman, Gilan, Zanzan, Kordestan, Semnan, Khorasan, Charmahal Bakhtiari, Kashan, Kermanshah, Golestan, Hamadan and Yazd.

and abnormal clinical and laboratory findings not classified elsewhere, psycho-behavioural diseases and neuro-system diseases.

The pattern of causes of diseases for both rural and urban areas is identical to the national level. However, the percentage of cardiovascular diseases in urban areas (1.6 per cent) is slightly higher than in rural areas. The other striking differences are the higher incidence of accidents and suicides in rural areas than in urban areas. The proportion of deaths from prenatal causes is relatively similar in both rural and urban areas, which is an indication of improvements in the health network system and the expansion of maternal and child health care in rural areas of the Islamic Republic of Iran.

Table 2 also shows causes of death for males and females. Although the general pattern of causes of death is similar for both males and females, differences exist between the three main causes of death for both sexes. As expected, the proportion of deaths from accidents is much higher for males (15.7 per cent) than females (7 per cent).

This is also true for deaths due to violence, which is significantly higher for males than females. On the contrary, the proportion of cardiovascular diseases is higher among females than males.

D. Mortality by causes of death and age

The age pattern of causes of death is shown in table 3. Prenatal causes were the main causes of death for under-five mortality, followed by accidents and infectious diseases, mainly acute respiratory infections and diarrhoea. On the contrary, cardiovascular diseases were a common cause of death in the age groups 40-44 and higher, ranging from around 29 per cent to 52 per cent. For example, about half the deaths in the age group 55-79 were due to cardiovascular diseases.

As expected, accidents were the cause of death at young ages, particularly in the age group 20-29 for which around 47 per cent of deaths were due to accidents. Strikingly, accidents (mainly car and motorcycle accidents) were also the main cause of death in the age groups 5-9 and 10-14. However, in view of the very young population structure

Table 3. Percentage of total deaths, by cause and age, in the Islamic Republic of Iran, 2000

Age groups	Cardio-vascular diseases	Accidents	Cancers	Prenatal causes	Infectious diseases	Suicide	Violence	Other	Total
0-4	3.0	7.2	1.1	48.8	5.1	0.0	0.1	34.7	100.0
5-9	8.0	43.7	10.1	0.2	2.3	0.0	1.2	34.4	100.0
10-14	6.4	40.1	12.2	0.2	3.2	4.1	1.5	32.4	100.0
15-19	6.5	42.7	9.8	0.0	1.3	12.8	3.9	23.0	100.0
20-24	4.8	47.4	6.1	0.0	1.7	12.4	7.5	20.0	100.0
25-29	8.3	47.5	7.0	0.0	1.8	8.3	5.9	21.2	100.0
30-34	13.0	40.9	10.2	0.0	1.6	5.4	5.8	23.1	100.0
35-39	17.4	34.1	13.7	0.0	2.4	3.4	3.8	25.1	100.0
40-44	28.5	27.2	14.8	0.0	1.7	2.9	1.9	22.9	100.0
45-49	35.5	21.0	16.7	0.0	2.1	1.5	1.4	21.8	100.0
50-54	45.2	12.4	18.5	0.0	1.2	1.3	0.9	20.5	100.0
55-59	48.1	9.1	18.6	0.0	1.4	0.8	0.6	21.4	100.0
60-64	49.4	7.4	17.7	0.0	1.2	0.3	0.2	23.8	100.0
65-69	52.6	5.7	14.9	0.0	1.2	0.3	0.2	25.2	100.0
70-74	50.9	3.8	13.5	0.0	1.1	0.2	0.2	30.3	100.0
75-79	49.3	3.0	10.9	0.0	1.3	0.1	0.0	35.4	100.0
80-84	35.6	1.8	6.1	0.0	1.1	0.1	0.0	55.2	100.0
85-89	32.2	1.8	3.5	0.0	0.9	0.1	0.0	61.4	100.0
90-94	27.0	1.5	2.7	0.0	1.2	0.0	0.0	67.6	100.0
95+	22.5	1.3	2.5	0.0	0.6	0.1	0.0	73.1	100.0
Total	34.8	12.0	10.7	4.4	1.7	1.5	1.0	33.9	100.0

Source: M. Naghavi (2003). *Situation of Mortality in 18 Provinces of Iran* (Tehran: Ministry of Health and Medical Education).

of the Islamic Republic of Iran, the proportion and the number of deaths from accidents are very high. Thus, preventive measures should be taken to save the lives of more people. Moreover, it should be noted that about 12-13 per cent of deaths in the age groups 15-19 and 20-24 are a result of suicide.

In general, the above-mentioned pattern holds for rural and urban areas as well as for males and females. However, there are slight differences between the level of each cause by age, area and sex. For example, suicide in the age groups 15-19 and 20-24 was considerably higher among females than males. The figures were also higher for those living in rural areas than those living in urban areas.

Considering the index of the expected number of years of life lost, accidents have been the leading cause of death in the Islamic Republic of Iran owing to the high incidence of death from accidents among persons at young ages (Naghavi and Akbari, 2002).

IV. OTHER EMERGING HEALTH ISSUES: ADOLESCENTS AND OLDER PERSONS

Within the mix of population issues meriting attention, adolescent reproductive health and population ageing and the health condition of these two groups are among the emerging health issues in the Islamic Republic of Iran.

Owing to the country's very young population structure along with the increasing level of education and the rise in the age at marriage, adolescent reproductive health has emerged as one of the main issues which should be addressed by the Government and particularly the health system.

The Iranian population, though still currently young, will age rapidly in the future. In 2002, those aged 65 and older accounted for only 5 per cent of the population, but this segment of the population will increase to 22 per cent of the total by 2050 (United Nations, 2002). Behind this rapid shift in the age structure are the rapid fertility decline and substantial improvements in life expectancy. The initial increase and subsequent fall in fertility over the last two decades has created a unique age structure, reflecting the current very young popula-

tion that will be followed by an ageing population in the coming decades. The issue of ageing in the Islamic Republic of Iran becomes much more salient and current, however, if note is taken of the considerable movement of young people from rural to urban areas. The issues involved include increased burdens of chronic disease, appropriate and affordable health care and social support, the role of family members, and pension and income security schemes (Abbasi-Shavazi, McDonald and Hosseini Chavoshi, 2004).

These concerns present many challenges to the country, particularly for the rural health-care delivery system. Further studies are needed to identify the demographic, socio-economic and health status of older persons in the Islamic Republic of Iran, and to examine the adequacy of the health and support systems for older persons. Such studies should assess the implications for programmes and policies relating to the health-care system and old-age security that affect the well-being of older persons, particularly in the rural areas.

V. SUMMARY AND CONCLUSION

This paper reviewed the socio-demographic changes in the Islamic Republic of Iran and examined the level and trends of mortality over the last 50 years. Findings from various studies show a remarkable fall in mortality rates, particularly infant and child mortality, and a substantial rise in life expectancy at birth for both males and females in rural and urban areas. The analysis has also revealed a shift in disease patterns from infectious and communicable diseases to non-communicable diseases. Cardiovascular diseases, accidents and cancers are the three main causes of death for males and females in both rural and urban areas. The Health Ministry has taken various steps towards further improvement of the health-care system, taking into consideration the recent changes in death and mortality transition.

In view of the fact that the majority of deaths are caused by cardiovascular diseases, accidents and cancers, the Government should adopt appropriate strategies to reduce the number of deaths from these causes. Monitoring the health of older persons, including providing services for health check-ups and cholesterol control as well as behavioural changes including diet and exercise, should be a

prime strategy in attempting to reduce cardiovascular diseases. Another issue is the expansion of advanced medical technology and access to specialized doctors and hospitals, which is possible only through the increase in coverage of insurance and government subsidies to monitor the health of older persons.

As shown, accidents are the second highest cause of death; they occur mainly among people at young ages. In view of the young population structure, policies aimed at reducing traffic accidents among young people would contribute to a

further fall in mortality. The introduction of heavy penalties on unlawful driving, stronger controls on the issuance of driving licences along with improvements in motorcycle and car production, as well as public awareness about safety issues would contribute to the reduction of mortality as a result of accidents among the young. Despite the improvements in health and the reduction in mortality, few studies have examined the trends and levels of mortality by causes of death in the Islamic Republic of Iran. Further studies are needed to deepen understanding of the mortality transition in the country.

References

- Abbasi-Shavazi, M.J. (2000). "Effects of marital fertility and nuptiality on fertility transition in the Islamic Republic of Iran", Working Papers in Demography, No. 84, Canberra, Australian National University.
- Abbasi-Shavazi, M.J. (2001). "Below replacement fertility in Iran: Progress and prospects", paper presented at the Workshop on Low Fertility in Advanced Countries: Trends, Theories and Policies, Tokyo, 21–23 March.
- Abbasi-Shavazi, M.J. (2002). "Recent changes and the future of fertility in Iran", paper presented at the Expert Group Meeting on Continuing Fertility Transition, Population Division of the United Nations, New York, 13–18 March.
- Abbasi-Shavazi, M.J., A. Mehryar, G. Jones and P. McDonald (2002). "Revolution, war and modernization: Population policy and fertility change in Iran", *Journal of Population Research*, vol. 19, No. 1, pp. 25–46.
- Abbasi-Shavazi, M.J., P. McDonald and M. Hosseini Chavoshi (2004). "Population ageing and its health policy implications in rural areas of Iran", paper presented at the International Symposium on Population and Sustainable Development Strategy, Shanghai, 23–25 October.
- Aghajanian, A. (1993). "Infant mortality trends and differentials in Iran", paper presented at Inter-Congress Seminar of Research Committee # 41, International Sociological Association, Montréal, Canada, 23–24 August.
- Amani, M. (1968). *Births and Fertility in Iran* (Tehran: Division of Population Research, Institute for Social Studies and Research, University of Tehran).
- Amani, M. (1996). "An attempt on historical outlook of the trends of birth and death rates and study of the stage of demographic transition in Iran" (Persian language), *Journal of Population*, vol. 13–14, pp.71–83.
- Amir-Khosrovi, A. (1994). "Demographic estimation on the basis of NOCR data and their applications" (Persian language), *Population*, vol. 13–14, pp. 1–24.
- Bharier, J. (1968). "A note on the population of Iran, 1900–1966", *Population Studies* 22(2): pp. 273–279.
- Bulatao, R.A. and G. Richardson (1994). "Fertility and family planning in Iran", Middle East and North Africa Discussion Paper Series, No. 13, Washington DC, World Bank.
- Choe, M.K. (2004). "Health transition in Asia: Implications on research and health policy", paper presented at the ESCAP Seminar on Emerging Issues of Health and Mortality, Bangkok, 27–29 September.
- Department of Family Health and Population (2004). *The National Safe Motherhood Program of Islamic Republic of Iran* (Tehran, Ministry of Health and Medical Education).
- Farahani, E. and S. Kazemipour (1977). *Mortality Situation in Greater Tehran* (Tehran, Division of Population Research, Institute for Social Studies and Research).
- Maroufi Bozorgi, N. (1967). "Population projection for Iran, 1956–1976", in United Nations Department of Economic and Social Affairs, *Proceedings of the World Population Conference, Belgrade, 30 August–10 September 1965, vol. 3, Selected Papers and Summaries: Projections, Measurement of Population Trends* (United Nations publication, E/CONF, 41/3), pp. 19–22.
- Mehryar, A. (1996). *Reproductive Health in Iran* (Tehran, Institute for Research on Planning and Development).
- Mehryar, A. (1997). *Health in Iran, 1976–1996* (Tehran, Institute for Research on Planning and Development).
- Mehryar, A. and M. Malekpour (1994). *Changing Pattern of Mortality in Iran: A Review of Available Evidence* (Tehran, Institute for Research in Planning and Development).

- Ministry of Health and Medical Education (MOHME) (2002). *Iran Demographic and Health Survey* (Tehran, MOHME).
- Mirzaie, M. (1998). "Swings in fertility limitation in Iran", Working Paper in Demography, No. 82, Canberra, Australian National University.
- Naghavi, M. (2000). *Situation of Mortality in Four Provinces of Iran* (Tehran, Ministry of Health and Medical Education).
- Naghavi, M. (2001). *Situation of Mortality in 10 Provinces of Iran* (Tehran, Ministry of Health and Medical Education).
- Naghavi, M. (2003). *Situation of Mortality in 18 Provinces of Iran* (Tehran, Ministry of Health and Medical Education).
- Naghavi, M. and E. Akbari, (2002). *Injuries Epidemiology in the Islamic Republic of Iran* (Tehran, Ministry of Health and Medical Education).
- Saraie, H. (1998). "The first stage of demographic transition in Iran" (Persian language), *Journal of Social Sciences*, vol. 9-10, pp. 51-67.
- Saraie, H. (2000). "Age composition, the momentum of population growth, and the future of population in Iran" (Persian language), *Journal of Social Sciences*, vol. 15, pp. 47-66.
- Statistical Centre of Iran (1996). *Iran Statistical Yearbook* (Tehran, SCI).
- Statistical Centre of Iran (2004). "Unifying mortality statistics: Short-term option – 2001", unpublished report, Statistical Centre of Iran, Tehran.
- Statistical Centre of Iran (various years). *Census on Population and Housing* (Tehran, SCI).
- United Nations (2002). *Population Ageing: 2002* (data sheet), Population Division, New York.
- World Health Organization (1992). *International Statistical Classification of Diseases and Related Health Problems*, tenth revision, vols. 1-3 (Geneva, WHO).
- Zanjani, H. (1991). *Population and Urbanization in Iran* (Tehran, Urban Planning and Architecture Research Centre).
- Zanjani, H. and M. Koosheshi (1992). *Study of Mortality in Iran* (Tehran, Urban Planning and Architecture Research Centre).
- Zanjani, H. and T. Nourollahi (2000). *Mortality Tables in Iran, 1996* (Tehran, Institute for Research on Social Welfare).

PART FOUR

Health-Care Systems and Health Care of Older Persons

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Chapter IX

A Comparison of Self-Assessed Health Expectancy Among Older Adults in Several Asian Settings

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Health expectancy, a concept introduced and developed in the mid-1960s and early 1970s (Sanders, 1964; Sullivan, 1971), is comparable to life expectancy, but makes reference to the expectation of years to be lived in a healthy state. Although several different methods have been developed for calculating health expectancies, they all combine information on mortality and morbidity and differentiate life expectancy into estimates of time lived in various states of health (Laditka and Hayward, 2003). The end result is a summary measure of population health, independent of age structure and adjusted for mortality. This measure can be viewed in absolute terms, such as in the number of years an individual can expect to live in a healthy state or in relative terms such as in healthy years of life as a proportion of total life expectancy (Jagger, 1999; Nusselder, 2003). As such, health expectancy estimates are useful for comparing health across populations (Saito, Crimmins and Hayward, 1999).

Numerous health expectancy and related studies have been conducted in the United States of America and other more developed countries (see Bebbington, 1991; Crimmins, Hayward and Saito, 1996; Hayward, Crimmins and Zhang, 2001;

Robine and Ritchie, 1991; Robine, Jagger and Romieu, 2001; Rogers, Rogers and Belanger, 1992; Sauvaget and others, 1999; Wilkins, Chen and Ng, 1994). Most of these studies have used measures of disability or chronic disease as the basis for calculating health expectancy. On balance, these studies show that healthy life expectancy declines with age, that men tend to spend a greater proportion of life in healthy states in comparison to women, and that several other determinants, including socio-economic status and social support, are also important. Despite considerable attention to research on health expectancy in the United States and Europe, however, such studies are limited in Asia and other less developed regions of the world. This paper is an attempt to begin to fill this gap.

I. AIMS OF CURRENT STUDY

We used data from national surveys of older adults in five Asian settings – China, Indonesia, the Philippines, Singapore and Thailand, all conducted within a span of several years in the mid-1990s – to estimate self-assessed health expectancy and to compare patterns in health expectancy across settings. The paper has two primary aims: (a) to estimate in a general way the years of life older adults in the five Asian societies can expect to live in self-assessed healthy and unhealthy states, and (b) to assess whether patterns of self-assessed health expectancy by age and sex are similar across the settings.

We consider self-assessed health to be a good starting point to compare the health of older adults across the diverse societies of Asia. At one level, self-assessments of health, which are derived

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from survey questions, typically worded along these lines – “How would you rate your health, very good, good, fair or poor?” – are highly subjective. However, self-assessed health has been found to correlate strongly with more objective measures of physical and mental health in many settings around the world, including those under study here (Idler and Benyami, 1997; Jylha and others, 1998; Larson, 1978; Zimmer and others, 2000; 2002). In addition, self-assessed health has been shown to be a strong predictor of mortality, even when controlling for physical health (Idler and Benyamini, 1997). As such, self-assessments of health are thought to encompass a broad range of health problems that are typical in old age, some of which may be subtle and difficult to measure in surveys, particularly across diverse populations.

In addition to its substantive appeal, the self-assessed health measure is attractive in another more practical regard, in that it is one of the most widely used measures of health in surveys around the world. Although the exact wording of the question and the response categories often differ across surveys, the response categories can typically be collapsed into one group that represents poor health and another that represents better than poor health, and this allows for at least some measure of comparison across very diverse settings.

The comparability of the self-assessed health measure across cultures has not been adequately investigated, and there may well be cultural variations in the interpretation of the question and response categories, as well as in how people evaluate their health (Jylha and others, 1998; Su and Ferraro, 1997; Zimmer and others, 2000). The subjective nature of the measure presents both advantages and disadvantages for cross-country comparisons. On one hand, self-assessed health may be less prone to problems associated with differing levels of knowledge or awareness of specific health conditions than other health measures that are often used in surveys (for example, reports of chronic conditions, which may require diagnosis by a physician). On the other, the subjective nature of the measure opens up room for differences in interpretation of the questions (what is the meaning of “health” and what aspects of health are taken into account in an individual’s rating?), as well as the reference groups that are used as the basis for rating one’s own health. Because of this, as well as slight differences in the wording of questions across

surveys, the focus of this paper is on comparing patterns rather than specific levels of self-assessed health across settings.

II. THE SETTINGS

The five countries that are part of the present study include four of the five most populous ones in East and South-East Asia, and when combined represent 81 per cent of the total population of East and South-East Asia and 76 per cent of the older population (aged 60 and older) in the region. All five are currently at some stage of population ageing, involving a transformation of their population from a younger to an older age structure. The populations of China and Singapore are ageing most rapidly. Each will see the proportion of those 60 and older grow from about 10 per cent today to 30 per cent or higher over the next 40 years, with Singapore’s ageing being the most rapid, that is, reaching 37 per cent of its total population by 2040 (DGBAS, 2003; United Nations, 2003). Thailand and Indonesia will experience growth in their older populations from about 8 per cent of their total population today to 20 per cent or higher by 2040. Ageing in the Philippines is less rapid. About 15 per cent of the Philippine population will be 60 or older by 2040.

Increased longevity contributes somewhat to the ageing of these populations. Life expectancy in all of these societies has reached levels that are not very different from those in the developed world. However, the main cause of population ageing is rapid reduction in fertility. Fertility rates in the five societies, which were 5 to 7 children per woman in the 1950s and 1960s, have fallen to under 2 in China, Singapore and Thailand and just over 2 in Indonesia. Fertility is still comparably high in the Philippines at about 3.5 children per family (United Nations, 2003).

Population ageing is taking place across Asia concurrently with rapid changes in the socio-economic structure of societies. However, there are distinct differences in this regard across the five societies examined in this paper. Singapore has experienced rapid growth in its economy over the last 20 years. The economic growth being experienced in China may be even more rapid, but it is also more recent. In contrast, Indonesia, the Philippines and Thailand are experiencing slower growth.

Changes in national economic standing can have an impact on health in a number of ways, such as through the availability of health-care resources and technology. In China, economic development has brought with it advances in medical technology, although there is growing evidence that a movement away from a cooperative medical system in rural areas has made accessibility to health care more difficult for many living in rural areas (Beach, 2001; Shi, 1993).

III. BENEFITS AND CHALLENGES OF COMPARATIVE ANALYSES

The ageing of these societies, coupled with associated changes in socio-economic structure, translates into learning lessons when comparing their health at the population level. Indeed, comparative analyses are the basis of much gerontological research on health. Most often comparisons are made across subgroups within a given population. For instance, it is common for researchers to compare health across categories of age, sex, race/ethnicity and other factors that are considered to be important for differentiating across groups. Another type of comparative analysis involves comparisons across countries or cultures, although these are less common in the literature.

The value of cross-country or cultural comparisons for understanding the variations in older adult health across socio-demographic characteristics was recognized decades ago (Burgess, 1960; Cowgill, 1972), but the lack of such analyses over time has led to a reemphasis of its importance in a number of more recent publications (Albert and Cattell, 1994; Bengtson and others, 2000; Chi, Chappell and Lubben 2001; National Research Council, 2001). These have underscored advantages in understanding variations in the underlying dynamics of ageing, improving the sense of generalizability of observations made in specific national and cultural contexts, and raising questions about the universality and alternatively the uniqueness of the ageing experience. Indeed, a number of hypotheses relating to associations between age and sex on one hand, and health on the other, are often assumed to be universal without rigorous testing across settings where social structures differ. In the present study, whether self-assessed health expectancy declines with age, as would be expected with most health measures, whether health expectancy is

greater for men or for women, and whether the age and gender patterns are consistent across the different settings are issues that are examined. The association between sex and health in particular has been well established in the West (Verbrugge, 1989), but has received surprisingly little attention in developing societies. We generally expect women to live longer than men, but to suffer more frequently from non-fatal physical conditions that limit their capacity to function or cause other types of distress such as pain.

One of the reasons for the lack of cross-country research on health and ageing in the developing world is that it is rare to find data that are comparable. In particular, surveys that collect information on the health of older adults in developing countries are not abundant. Researchers who are interested in health and ageing in developing societies often need to rely on surveys that have been conducted at different time points, by separate research organizations, using different approaches in measuring health. The present study is based on a set of surveys of older persons in five Asian societies, conducted at similar points in time, all of which included a measure of self-assessed health.

We capitalized on the range of socio-economic development status that these societies represent, ranging from Singapore at one end of the spectrum representing a developed country's economy, to Indonesia at the other end of the spectrum representing a lower income developing country. Our analysis is important for policy makers interested in the relationship between socio-economic development and health status. By using this set of countries, "cultural effects", that is, whether there is any relationship between the dominant cultural ideology in particular countries and health status, were tested. China and Singapore represent historically Confucian populations where the dominant ideology is patriarchal; such a setting may have implications for older women's health status (such that over the life course females are disadvantaged in terms of access to health-care resources compared with males). Thailand provides an example of a largely Buddhist population and a society more tolerant of matriarchal family structures (see Knodel and Ofstedal (2002) for work on living arrangements and daughter preference). Finally, Indonesia represents a largely Muslim population in which gender differences in roles may

affect older women's health status. Policy makers interested in specific policies, as opposed to blanket policies, should be sensitive to cultural variations in the interpretation of any social behaviour. The analysis here provides a first step in investigating whether there are any macro-level differences in health expectancy by age and sex across the culturally distinct countries chosen for analysis.

IV. METHODS

A. Data

The data come from nationally representative, cross-sectional surveys of older adults in each of the five settings. Table 1 provides information on

the name, interview years and sample sizes (for respondents 60 years of age or older) for each of the surveys. The surveys in the Philippines, Singapore and Thailand were designed as part of the project entitled "Rapid Demographic Change and the Welfare of the Elderly", conducted by the Population Studies Center of the University of Michigan. The Chinese data come from the China Research Center on Ageing's "Survey of Support for the Elderly in China". The Indonesian data come from the "Indonesian Family Life Survey", conducted by the Rand Corporation. All of the surveys, except the China survey, included interviews with respondents aged 60 and younger; however, for comparability purposes, the analysis is restricted to those aged 60 and older in each setting.

Table 1. Data sources

<i>Setting</i>	<i>Survey</i>	<i>Interview year</i>	<i>Sample size (age 60+)</i>
China	Survey of Support for the Elderly in China	1992	20,083
Indonesia	Indonesian Family Life Survey	1993	2,956
Philippines	Philippine Survey of the Near Elderly and Elderly	1996	1,311
Singapore	National Survey of Senior Citizens in Singapore	1995	4,001
Thailand	Social Welfare of the Elderly in Thailand	1995	4,486

As noted previously, the present analysis uses a survey item for each setting that asked respondents to rate their current overall health on a scale (either 4-point or 5-point) ranging from excellent or very good to poor. The precise wording and response categories used in each setting differed somewhat. Table 2 shows the English-language translation of the questions and response categories. For purposes of the present analysis, the self-assessed health measure was dichotomized into two broad categories that may have reflected positive or neutral health ratings (excellent, good, average, fair) versus negative health ratings (not good, poor). The positive or neutral ratings are hereafter referred to as "healthy self-assessments", and the negative ratings as "unhealthy self-assessments".

B. Method of analysis

The Sullivan method for calculating the years expected to be spent in a self-assessed

healthy versus unhealthy state was used. The Sullivan approach partitions life expectancy into different states of health based on the distributions within a population at a single point in time (Sullivan, 1971). As such, the Sullivan method reflects the current health of a real population adjusted for mortality levels (Jagger, 1999). This method has been used quite extensively for estimations of health expectancy and trends in health expectancy (e.g., Bebbington, 1991; Colvez and Robine, 1983; Crimmins, Saito and Ingegneri, 1989; Mathers, 1991; Wilkins and Adams, 1983).

The Sullivan method requires as input two pieces of information: age and sex-specific life expectancy estimates, and age and sex-specific probabilities of reporting a healthy self-assessment. Life expectancy estimates were obtained from abridged life tables for each setting for the survey year or, in the case of the Philippines, one year earlier (1995). All of the life expectancies were

Table 2. Self-assessed health question and response wording

<i>Country</i>	<i>Question text</i>	<i>Response categories</i>
China	Do you feel healthy?	1=Healthy 2=Fair 3=Unhealthy
Indonesia	In general, how is your health at this time?	1=Very healthy 2=Somewhat healthy 3=Somewhat unhealthy 4=Unhealthy
Philippines	How would you rate your health at the present time? Would you say it is:	1=Excellent 2=Very good 3=Good 4=Fair 5=Poor
Singapore	How would you rate the state of your health at present? Would you say it is:	1=Very good 2=Good 3=Not too good 4=Poor
Thailand	How do you feel about your health in general?	1=Very healthy 2=Rather healthy 3=Moderate 4=Rather weak 5=Weak

reported separately for males and females and for specific ages separated by five years: 60, 65, 70, 75, 80 and 85. In order to obtain an estimate of life expectancy for a five-year age group, the simple average of the life expectancies for the two ages bordering the age group (for example, the 60-64 age group: $e_{60}+e_{65}/2$) was used. Finally, in order to obtain the life expectancy for both sexes combined for a given age group, we took the weighted average of the male and female life expectancies for the age group, weighted according to the sex distribution in that age group as observed in the survey sample.

Age was collapsed into five-year groups from age 60-64 through to the last category of 85+. We smoothed the age-specific probabilities of reporting healthy self-assessments by predicting self-assessed health as a linear function of the five-year age groups, first for the total population, then separately for males and females (see appendix 1 for regression results and predicted probabilities.) Age-heaping is a problem in Indonesia, with heaping occurring at decade and mid-decade years. The use of five-year age groups helps to alleviate this problem, but the age patterns in Indonesia may still be slightly underestimated as a result. For all

analyses, the samples are weighted to be representative of the total population of older persons in each setting at the time of the survey. Finally, many of the results are presented in figures, and these use midpoints of age groups for plotting the point estimates.

V. RESULTS

A. Self-assessed health

Table 3 presents the percentage of respondents who reported poor self-assessed health for each sample by age and sex. Overall, there are fairly substantial differences in levels across the settings, with the percentage reporting poor self-assessed health ranging from 15 to 35 per cent for the total sample. Older adults are the least likely to report poor self-assessed health in the Philippines and Singapore and most likely to do so in Thailand. There are strong associations with age in each setting, with the oldest-old (aged 80+) being most likely to report poor health ratings. The slope of the age pattern differs across settings and by sex, however. The largest age differentials occur in the Philippines and in Singapore, and among men in

Appendix 1: Regression coefficients, standard errors and predicted probabilities of being in a self-assessed unhealthy state used to generate Sullivan health expectancies

	<i>China</i>	<i>Indonesia</i>	<i>Philippines</i>	<i>Singapore</i>	<i>Thailand</i>
Total sample					
Regression estimates					
Age coefficients	.119 (.013)	.175 (.034)	.292 (.052)	.247 (.031)	.208 (.022)
Intercept	-1.595	-1.456	-2.509	-2.667	-1.114
Predicted probabilities					
60-64	.186	.217	.098	.117	.288
65-69	.205	.248	.127	.145	.332
70-74	.225	.283	.163	.178	.380
75-79	.246	.319	.207	.218	.430
80-84	.269	.358	.259	.262	.481
85+	.293	.399	.319	.313	.533
Male					
Regression estimates					
Age coefficients	.149 (.020)	0.139 (.048)	.351 (.085)	.297 (.050)	.309 (.034)
Intercept	-1.800	-1.406	-2.721	-2.567	-1.640
Predicted probabilities					
60-64	.161	.220	.085	.094	.209
65-69	.182	.245	.117	.122	.265
70-74	.205	.271	.158	.158	.329
75-79	.231	.300	.211	.201	.401
80-84	.258	.330	.275	.254	.477
85+	.288	.361	.350	.314	.554
Female					
Regression estimates					
Age coefficients	.086 (.016)	.208 (.048)	.253 (.067)	.203 (.039)	.125 (.028)
Intercept	-1.398	-1.503	-2.363	-2.019	-0.694
Predicted probabilities					
60-64	.212	.215	.108	.140	.361
65-69	.227	.252	.135	.166	.391
70-74	.242	.293	.167	.196	.421
75-79	.258	.338	.206	.231	.452
80-84	.275	.387	.250	.269	.483
85+	.292	.437	.300	.310	.514

Note: Figures in parentheses denote standard errors.

Thailand, where those aged 80 and older are more than twice as likely to report poor self-assessed health as those aged 60 to 69 years. In addition, China, Indonesia and Thailand show sharp increases between the two younger age groups in the percentage reporting negative health ratings, but less pronounced or no increases between the two oldest age groups. In contrast, in the Philippines and Singapore, the increase is quite linear.

Self-assessed health also differs by sex in the expected direction. Women are more likely than men to report poor self-assessed health in most settings, and these differences generally hold across age groups. Two exceptions to this pattern are Indonesia and the Philippines, where the gender differences are in the same direction (that is, higher for women than men), but they are not statistically significant.

Table 3. Percentage reporting negative health ratings by age, sex and country

<i>Age/sex</i>	<i>China</i>	<i>Indonesia</i>	<i>Philippines</i>	<i>Singapore</i>	<i>Thailand</i>
Total	21.2	24.8	15.2	16.6	35.3
60-69	19.3	22.4	11.6	12.6	29.8
70-79	24.0	31.3	17.6	20.4	42.8
80+	26.1	34.2	26.7	27.0	47.8
Chi-square	79.1 (.000)	28.1 (.000)	22.7 (.000)	62.6 (.000)	99.3 (.000)
Males	18.8	24.3	14.2	14.1	28.9
Females	23.4	25.4	15.9	18.8	40.6
Chi-square	62.4 (.000)	0.5 (.494)	0.7 (.397)	13.1 (.000)	66.1 (.000)
Males					
60-69	16.9	22.3	10.3	9.7	21.7
70-79	22.0	30.5	16.9	20.4	40.4
80+	25.2	29.9	32.0	23.0	46.2
Chi-square	47.8 (.000)	10.4 (.005)	17.7 (.000)	39.6 (.000)	94.8 (.000)
Females					
60-69	21.6	22.5	13.0	15.3	37.0
70-79	25.7	32.1	18.1	20.4	44.6
80+	26.6	37.3	24.4	29.3	48.8
Chi-square	25.7 (.000)	17.9 (.000)	8.1 (.017)	25.6 (.000)	20.5 (.000)
Number ^a	20,083	2,868	1,307	4,001	4,479

Note: Figures within parentheses denote p-values.

^a These sample sizes reflect the unweighted number of respondents who had non-missing data on age, sex and self-assessed health, on which all analyses were based.

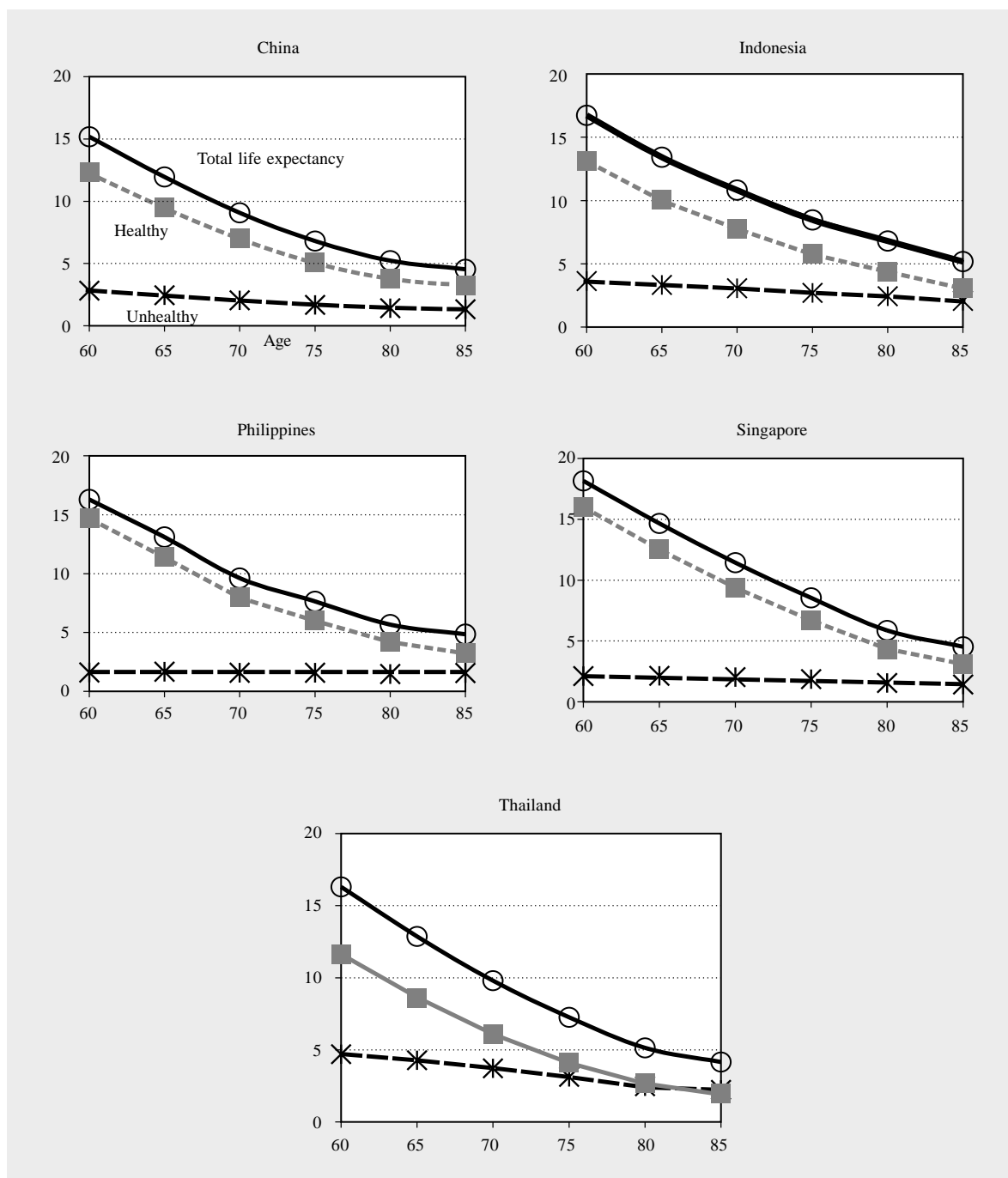
B. Life and health expectancies

Figure 1 compares life and health expectancies based on the Sullivan estimates. Life expectancies at age 60 across the four settings range between 15 and 18 years for those aged 60, with the highest expectancies occurring in Singapore. Despite differences in the proportion reporting unhealthy self-assessed health across settings (as shown in the previous table), there is a great deal of similarity in age patterns of health expectancy. In all countries, healthy life expectancy at age 60 far outweighs unhealthy life expectancy, but the two converge or nearly converge by age 85. Healthy life expectancy declines steadily with age in each setting, whereas unhealthy life expectancy remains fairly stable in the Philippines and Singapore, while its declines very slightly in China and Indonesia, and shows modest declines in Thailand. The result is that in each setting, those who live to about age 85 or older can expect to live almost equal amounts of time in healthy and unhealthy self-assessed states. These patterns are quite similar to those

observed in previous studies using measures of physical functioning and disability (Bebbington, 1988; Lamb, 1999).

As for age and sex comparisons, figure 2 presents the years of healthy life remaining for males and females by age across settings. There is a small amount of variation across settings in healthy life expectancy for men at age 60, ranging from about 12 to 15 years, and somewhat more variation for women, ranging from 11 to 17 years. The declines in healthy life expectancy by age are quite consistent across settings, and by age 85 there is little variation in the number of healthy years of remaining life. At age 85, the expectation is between two and three years of self-assessed healthy life for both men and women in all settings. Reflecting their tendency to report more negative health ratings as shown in table 3, Thai women consistently have the fewest healthy years remaining at each age. Given differences in the wording and response categories of the questions as described previously, it is not possible to determine

Figure 1. Total life expectancy, self-assessed healthy life expectancy and self-assessed unhealthy life expectancy across five Asian countries



whether Thai women are indeed less healthy than women in the other settings, or whether this difference is due to measurement inconsistencies. Further work is needed to identify whether these findings for Thailand are similar when objective

health measures such as chronic illness and disability are used. Both men and women in Singapore start out with the highest number of healthy years at age 60 but converge with the others at older ages.

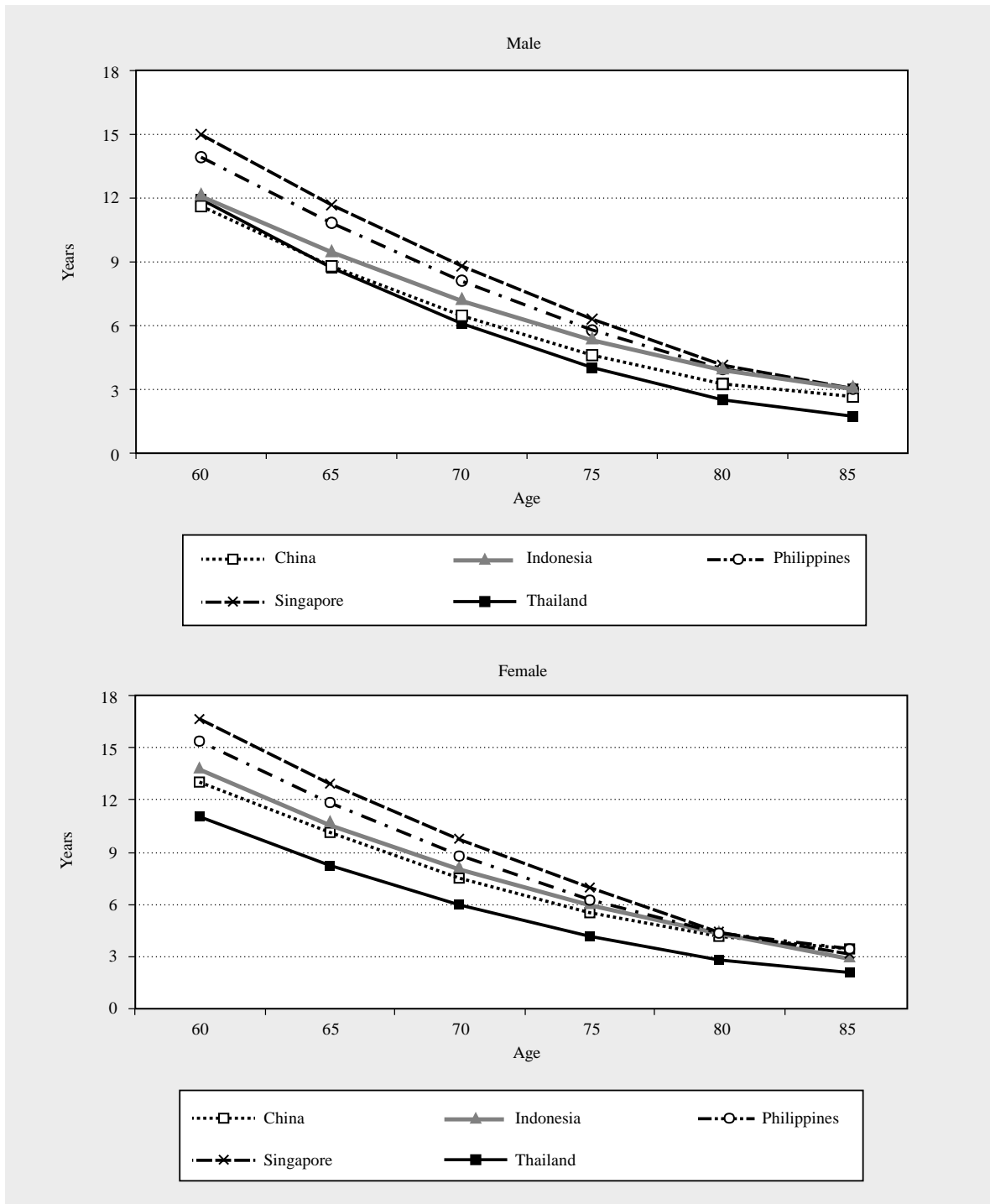
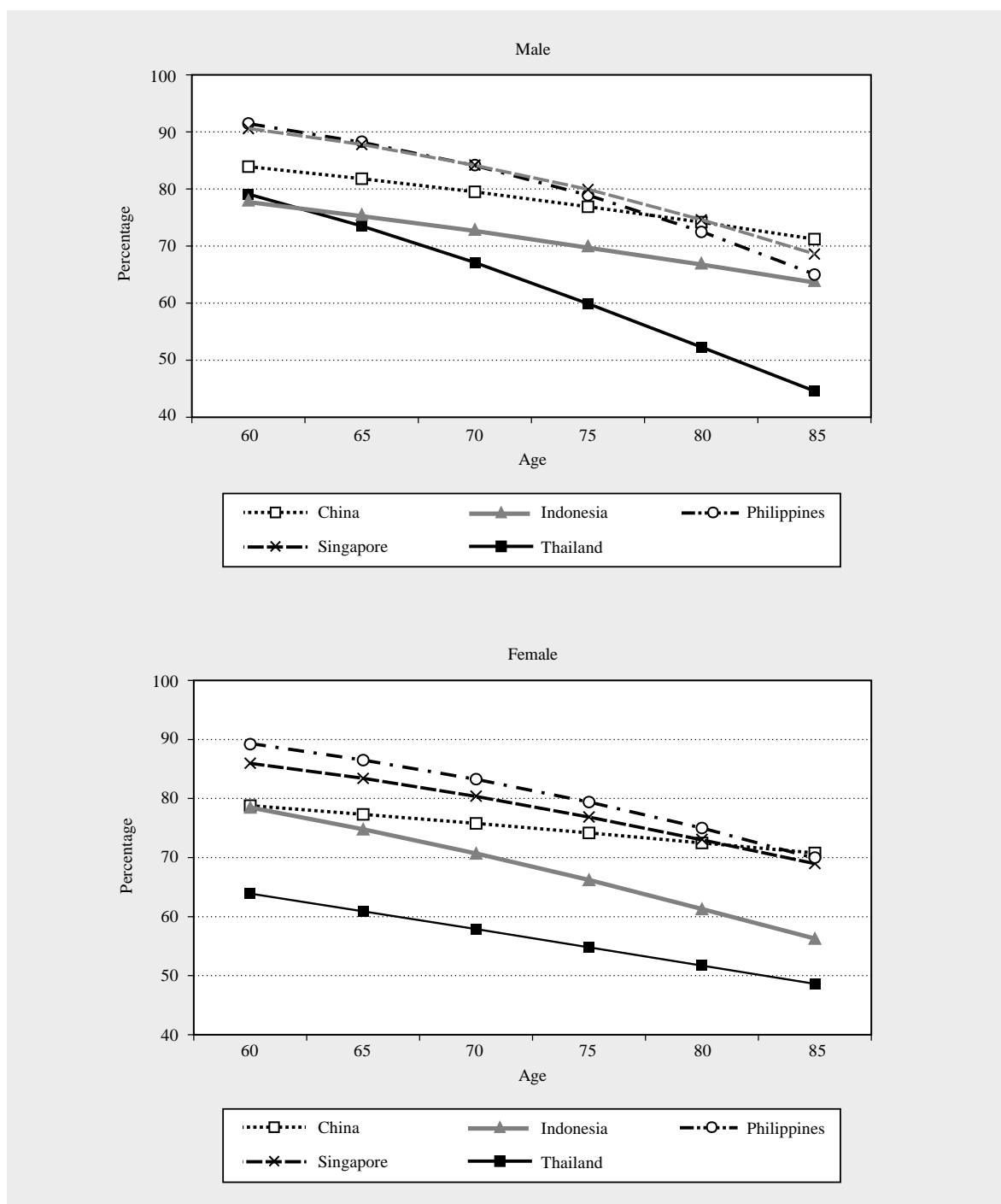
Figure 2. Expected self-assessed healthy years of life remaining across Asian settings by age and sex

Figure 3 shows the percentage of remaining life that is expected to be spent in a healthy self-assessed state. In all settings, both men and women exhibit declines by age with the result that older

people spend a smaller fraction of their remaining life in a healthy self-assessed state than is the case for younger people. The declines are fairly steady across the settings, except for men in Thailand and

Figure 3. Percentage of life remaining in a self-assessed healthy state across Asian settings by age and sex

women in Indonesia who display sharper declines by age. The percentage of time spent healthy ranges from about 75 to 90 per cent for men at age 60 and falls by approximately 10 to 20 percentage points up to age 85, except for Thailand where the decline

is about 35 percentage points. For women, the percentage of time ranges from about 65 to 90 per cent, and the decline is also between about 15 and 20 percentage points up to age 85. Put another way, in general, for each year of age, the percentage of

remaining time spent in a self-assessed healthy state declines by about 0.5 per cent with some variation across settings. The inconsistency in gender patterns across countries suggests that gender roles may affect the self-assessment of health differentially depending on the cultural context.

Thus far, our results have echoed the expected associations of healthy life expectancy with age. As a last step in the analysis, female-to-male ratios for life expectancy, healthy life expectancy and the percentage of life spent healthy were examined in order to make more direct gender comparisons. These ratios are presented in table 4. Ratios over 1.0 indicate a female advantage in life or health expectancy; ratios under 1.0 indicate a male advantage and ratios of 1.0 imply no gender difference.

The top panel in table 4 presents female-to-male ratios for total life expectancy. Because women tend to live longer than men in these settings, life expectancy ratios are greater than 1.0 at all ages. The ratio is about 1.1 to 1.2, indicating that life expectancy is 10 to 20 per cent higher for women than for men. China stands out as having

higher ratios than elsewhere (1.2 to 1.3). These higher sex ratios in life expectancy may reflect gender differentials in health-care behaviour and health-care utilization. In addition, health-care infrastructure and policy particular to the Chinese situation may influence sex ratios in life expectancy.

On balance, sex ratios for healthy life expectancy (see table 4, middle panel on self-assessed healthy life expectancy) are lower than those for life expectancy. For instance, in China, life expectancy for the age group 60 to 64 is 1.2 times greater for women than for men, while health expectancy is 1.12 times greater. Thus, older women in China still have an advantage with respect to years of healthy life, but their advantage is not as large as for years of total life remaining. The net result is that, although women in these Asian settings live longer than men and they tend to live longer in a healthy self-assessed state than men (with some key exceptions as noted below), the percentage of their remaining life that is spent in a healthy state is lower than that of men. This is shown in the third set of ratios. For example, in China, women aged 60 to 64 spend 0.94 times the amount of remaining

Table 4. Female-to-male ratios: Total life expectancy, healthy self-assessed life expectancy and percentage of remaining years in self-assessed healthy state

<i>Measure/setting</i>	<i>Age group (years)</i>					
	<i>60-64</i>	<i>65-69</i>	<i>70-74</i>	<i>75-79</i>	<i>80-84</i>	<i>85+</i>
Total life expectancy						
China	1.20	1.22	1.22	1.23	1.30	1.30
Indonesia	1.13	1.14	1.16	1.19	1.22	1.10
Philippines	1.13	1.11	1.09	1.07	1.06	1.06
Singapore	1.17	1.17	1.16	1.15	1.10	1.05
Thailand	1.14	1.14	1.13	1.12	1.11	1.10
Self-assessed healthy life expectancy						
China	1.12	1.15	1.16	1.19	1.27	1.30
Indonesia	1.14	1.13	1.12	1.12	1.11	0.97
Philippines	1.10	1.09	1.08	1.08	1.10	1.14
Singapore	1.11	1.11	1.11	1.10	1.08	1.05
Thailand	0.92	0.94	0.98	1.03	1.10	1.20
Percentage of remaining years in self-assessed healthy state						
China	0.94	0.94	0.95	0.96	0.98	0.99
Indonesia	1.01	0.99	0.97	0.95	0.91	0.88
Philippines	0.97	0.98	0.99	1.01	1.03	1.08
Singapore	0.95	0.95	0.95	0.96	0.98	1.01
Thailand	0.81	0.83	0.86	0.91	0.99	1.09

life in a self-assessed healthy state in comparison to men or about 6 per cent less time. This gap generally narrows as age increases, with the result that by age 85 the percentage of remaining life spent healthy is nearly equal (in China and Singapore) or higher (in the Philippines and Thailand) for women compared with men. Two exceptions to this pattern are Indonesia and the Philippines where the gender gap in percentage of remaining life spent healthy increases with age.

The male advantage in terms of percentage of healthy life is most apparent for the younger age groups (60-79) in Thailand and the oldest age groups (80+) in Indonesia. These are also the groups for which there is little or no female advantage in terms of years of healthy life (see middle panel). In the Philippines, women are somewhat advantaged with respect to both total life expectancy and healthy life expectancy, but there is essentially no gender difference in the percentage of remaining life spent healthy, except possibly at age 85.

VI. DISCUSSION AND CONCLUSION

The main purpose of this study was to compare age and gender patterns of health expectancy among older adults in five Asian settings. This paper is part of a broader study to test the universality of a range of hypotheses relating to population trends and individual-level transitions in the health of older persons and the determinants of health in later life. Most previous studies of health expectancy have been conducted in the West, and research on this topic has only recently gained attention in other less developed regions of the world.

As noted at the outset, all of the study settings, like most places in East and South-East Asia, are undergoing rapid population ageing (Kinsella, 2000). The ageing of these societies has caused concern among policy makers about the potential implications for future disease burden and associated informal and formal care demands (Hermalin, 1995; Phillips, 2000). Some estimate that the demand for health care is likely to escalate at an unprecedented pace in countries that are ageing most rapidly, which would place a burden on the health infrastructure, as well as on government resources and ultimately society.

Health expectancy analysis, which provides estimates of the years that individuals can expect to spend in healthy and unhealthy states, can be valuable for estimating the demand for future health care. The focus here was on self-assessed health as a measure of health expectancy. It must be said that there are limitations to using this measure since it is regarded as a subjective measure of health and interpretations can vary across societies and cultures. Yet, it has also been shown to be a powerful measure, reflecting an individual's assessment of his/her physical and mental health on both subjective and objective dimensions, and is available in many surveys around the world. Furthermore, self-perceptions of health that are reflected in this measure may be as much, if not more of an impetus for help-seeking, be it from a health professional or assistance at home from a relative or friend, than other more "objective" measures of health. Hence, self-assessed health may be a particularly important indicator of the potential demand for health services and long-term care needs of the population of older persons.

Another limitation of this measure in the present study is that the wording and response categories of the questions differed somewhat across the surveys, which posed problems for comparisons of the level of health expectancy across settings. Thus, the paper focused primarily on comparisons of age and gender patterns in health expectancy across the five settings.

On this point, it was found that patterns in health expectancy by age and sex are quite similar and are consistent with findings from other studies based on different health measures. The number and percentage of years spent in a healthy self-assessed state decline substantially with age, whereas the number of years spent in an unhealthy state is quite stable over the age range. The net result is a convergence of healthy and unhealthy life, so that by age 85, the amount of time spent in each state is more equal. With regard to sex differences, in general the findings here echo those from other studies of health expectancy that found women more than men living longer but less healthy lives. These patterns were consistent despite fairly substantial differences in the underlying levels of self-assessed health across the settings.

Although the general picture is one of similarity, there are a few notable differences in the age and gender patterns of self-assessed health expectancy

across the five settings. For example, Thai men and Indonesian women experience more pronounced declines in self-assessed health and in the percentage of healthy life remaining, whereas the declines with age are much more gradual among Chinese men and women. With regard to gender differences, one key difference is the apparent crossover for men and women in Thailand, whereby women are disadvantaged relative to men at younger ages, but advantaged at older ages. This is one of the few examples, to our knowledge, of such a crossover and we intend to make this the subject of further study.

In addition, the results of this study suggest that Asian societies, in general, follow the age and gender patterns of self-assessed health expectancy found in Western societies. This finding points to the need to fashion policies that pay particular attention to the higher incidence of morbidity among older women. As a next step in this research, it is planned that more typical measures of health expectancy (based on functional limitation

and the presence of chronic conditions) will be utilized for the examination of how age and sex patterns based on those measures compare with those derived from self-assessed health. Of particular interest will be whether the divergent age and sex patterns described in this paper are mirrored in other health measures.

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References

- Albert, Stephen M. and Maria G. Cattell (1994). "Family relationships of the elderly: living arrangements", in *Old Age in Global Perspective: Cross-Cultural and Cross-National Views* (New York, G.K. Hall & Co.), pp. 85-107.
- Beach, Marilyn (2001). "China's rural health care gradually worsens", *Lancet*, vol. 358, 18 August, p. 567.
- Bebbington, A.C. (1991). "The expectation of life without disability in England and Wales: 1976-88", *Population Trends*, vol. 66, pp. 26-29.
- Bebbington, A.C. (1988). "The expectation of life without disability in England and Wales", *Social Science and Medicine*, vol. 27, pp. 321-326.
- Bengtson, Vern L., Kyong-Dong Kim, George C. Myers and Ki-Soo Eun (eds.) (2000). *Ageing in East and West: Families, States, and the Elderly* (New York, Springer Publishing Company).
- Burgess, Ernest W. (1960). *Ageing in Western Societies* (Chicago, University of Chicago Press).
- Chi, Iris, Neena L. Chappell and James Lubben (eds.) (2001). *Elderly Chinese in Pacific Rim Countries: Social Support and Integration* (Hong Kong, China, Hong Kong University Press).
- Colvez, Alain and Jean-Marie Robine (1983). "Potential gains in life expectancy free of disability: A tool for health planning" *International Journal of Epidemiology*, vol. 12, pp. 224-229.
- Cowgill, Donald O. (1972). "A theory of ageing in cross-cultural perspective", in D. O. Cowgill and L. D. Holmes, eds., *Ageing and Modernization* (New York, Meredith Corporation).
- Crimmins, Eileen M., Mark D. Hayward and Yasuhiko Saito (1996). "Differentials in active life expectancy in the older population of the United States", *Journal of Gerontology: Social Sciences*, vol. 51B, pp. S111-S120.
- Crimmins, Eileen M., Yasuhiko Saito and Dominique Ingegneri (1989). "Changes in life expectancy and disability-free life expectancy in the United States", *Population and Development Review*, vol. 15, pp. 235-267.
- Hayward, Mark D., Eileen M. Crimmins and Zhenmei Zhang (2001). "Consequences of educational changes for the burden of chronic health problems in the population", paper presented at the International Meeting on Age Structure Transitions and Policy Dynamics: The Allocation of Public and Private Resources across Generations, 6-8 December 2001, Academia Sinica, Taipei, Taiwan Province of China.
- Hermalin, Albert I. (1995). "Ageing in Asia: Setting the research foundation", *Asia-Pacific Population Research Reports, No. 4*, East-West Center, Honolulu, Hawaii.
- Idler, Ellen L. and Yael Benyami (1997). "Self-rated health and mortality: A review of twenty-seven community studies", *Journal of Health and Social Behavior*, vol. 38, pp. 21-37.
- Kinsella, Kevin (2000). "Demographic dimensions of ageing in East and Southeast Asia", in D.R. Phillips, ed., *Ageing in the Asia-Pacific Region* (New York, Routledge), pp. 35-50.
- Jagger, Carol (1999). "Health expectancy calculations by the Sullivan method: A practical guide", Nihon University Population Research Institute Research Paper Series No. 68, Tokyo, Japan.
- Jylha, Marja, Jack M. Guralnik, Luigi Ferrucci, Jukka Jokela and Eino Heikkinen (1998). "Is self-rated health comparable across cultures and genders?" *Journal of Gerontology*, vol. 53B, pp. S144-S15.
- Knodel, J. and M.B. Ofstedal (2002). "Patterns and Determinants of Living Arrangements", in Albert I. Hermalin, ed., *The Well-Being of*

- the Elderly in Asia: A Four-Country Comparative Study* (Ann Arbor, Michigan, University of Michigan Press).
- Laditka, Sarah B. and Mark D. Hayward (2003). "The evolution of demographic methods to calculate health expectancies", in J.M. Robine, C. Jagger, C.D. Mathers, E.M. Crimmins and R.M. Suzman, eds., *Determining Health Expectancies* (Hoboken, NJ, Wiley), pp. 221-234.
- Lamb, Vicki L. (1999). "Active life expectancy of the elderly in selected Asian countries", Nihon University Population Research Institute Research Paper Series No. 69, Tokyo, Japan.
- Larson, R. (1978). "Thirty years of research on the subjective well-being of older Americans", *Journal of Gerontology*, vol. 33, No. 1, pp. 109-125.
- Mathers, Colin D. (1991). *Health Expectancy in Australia 1981 and 1988* (Canberra, Australian Government Printing Service).
- National Research Council (2001). *Preparing for an Ageing World: The Case for Cross-National Research* (Washington DC, National Academy Press).
- Nusselder, Wilma J. (2003). "Compression of morbidity", in J.M. Robine, C. Jagger, C.D. Mathers, E.M. Crimmins and R.M. Suzman, eds., *Determining Health Expectancies* (Hoboken, NJ, Wiley), pp. 35-58.
- Phillips, David R. (2000). "Ageing in the Asia-Pacific region: Issues, policies and contexts", in D.R. Phillips, ed., *Ageing in the Asia-Pacific Region: Issues, Policies and Future Trends* (New York, Routledge), pp. 1-34.
- Robine, Jean M. and Karen Ritchie (1991). "Healthy life expectancy: Evaluation of global indicator of change in population health", *British Medical Journal*, vol. 302, pp. 457-460.
- Robine, Jean-Marie, Carol Jagger and Isabelle Romieu (2001). "Disability-free life expectancies in the European Union countries: Calculation and comparisons", *Genus*, vol. 58, pp. 89-101.
- Rogers R., A. Rogers and A. Belanger (1992). "Disability-free life among the elderly in the United States", *Journal of Ageing and Health*, 4:19-42.
- Saito, Yasuhiko, Eileen M. Crimmins and Mark D. Hayward (1999). "Health expectancy: An overview", Nihon University Population Research Institute Research Paper Series No. 67, Tokyo, Japan.
- Sanders, B. (1964). "Measuring community health level", *American Journal of Public Health*, vol. 54, pp. 1063-1070.
- Sauvaget, Catherine, Ichiro Tsuji, Takanori Aonuma and Shigeru Hisamichi (1999). "Health-life expectancy according to various functional levels", *Journal of the American Geriatrics Society*, vol. 47, pp.1326-1331.
- Shi, L. (1993). "Health care in China: A rural-urban comparison after the socio-economic reforms", *Bulletin of the World Health Organization*, vol. 71, No. 6, pp. 723-736.
- Su, Ya-Ping and Kenneth F. Ferraro (1997). "Social relations and health assessments among older people: Do the effects of integration and social contributions vary cross-culturally?" *Journal of Gerontology*, vol. 52B, pp. S27-S36.
- Sullivan, Daniel F. (1971). "A single index of mortality and morbidity", *American Journal of Public Health*, vol. 86, pp. 347-354.
- United Nations (2003). *World Population Prospects: The 2002 Revision, Volume II, Sex and Age* (United Nations publication, Sales No. E.01.XIII.7).
- Verbrugge, Lois M. (1989). "The twain meets: Empirical explanation of sex differences in health and morbidity", *Journal of Health and Social Behavior*, vol. 30, pp. 282-304.
- Wilkins, Russell and Owen B. Adams (1983). "Health expectancy in Canada, late 1970: Demographic, regional and social dimensions", *American Journal of Public Health*, vol. 73, pp. 1073-1080.

- Wilkins, Russell, Jiajian Chen and Edward Ng (1994). "Projections of health expectancies: Changes in health expectancy in Canada from 1986 to 1991", in *Advances in Health Expectancies* (Canberra, Australian Institute of Health and Welfare), pp. 115-132.
- Zimmer, Zachary, Josefina Natividad, Hui-Sheng Lin and Napaporn Chayovan (2000). "A cross-national examination of the determinants of self-assessed health", *Journal of Health and Social Behavior*, vol. 41, pp. 465-481.
- Zimmer, Zachary, Josefina Natividad, Mary Beth Ofstedal and Hui-sheng Lin (2002). "Physical and mental health and well-being", Chapter 9 in A.I. Hermalin, ed., *The Well-Being of the Elderly in Asia: A Four-Country Comparative Study* (Ann Arbor, Michigan, University of Michigan Press).

Chapter X

Health Status of Older Thais: Current Situation, Problems and Policy Implications

*Yoshie Moriki-Durand**

The ageing of a society involves more than just a change in the population structure. It also involves a paradigm shift that leads to a modification and reconstruction of the society. The consequences of an ageing population are expressed in a variety of ways, each of which involves issues that require particular political as well as research attention. One of these is the health status of older persons and their resulting quality of life in old age. Older persons are more susceptible to different health risks and often require assistance and support for their health-care needs. Thus, assessing their current health status, understanding their major health problems and envisioning strategies to improve the situation are all necessary for ensuring adequate levels of well-being for older persons.

In this paper, the health status of older persons in Thailand is examined, focusing on their disability status and related chronic diseases. In addition, issues related to the provision of health care for older Thais are mentioned to depict their current support system. The first section introduces the conceptual framework and measurements of health that guide the ensuing analysis. The second part of the paper assesses the health status of older Thais, and also examines their sources of health-care provision. The analysis identifies areas that suggest particular problems that require strong political attention. The last section presents policy implications emerging from the analysis.

I. BACKGROUND OF POPULATION AGEING

A. The ageing of the Thai population

An overview of Thailand's changing population structure follows worldwide trends in population ageing, a process that has been occurring since the latter part of the last century. Researchers have been calling for attention to this phenomenon as population ageing is no longer a product only of developed countries, but an emerging issue for less developed countries in Asia as well (Jones, 1993; Martin, 1988). In the next 50 years, many countries in Asia, including Thailand, will experience rapid population ageing, more drastic than the population ageing previously experienced by developed countries (Hayward and Zhang, 2001).

The demographic indicators in tables 1 and 2 show that since the 1970s the population of Thailand has become increasingly older. In 1970, the percentage of people aged 60 years and older was just under 5 per cent. This figure passed 8 per cent in 2000 and is projected to be more than 15 per cent by 2025 and 24 per cent by 2040. In contrast, the younger population (less than 25 years old) shrank from about 64 per cent to 44 per cent between 1970 and 2000, and will further decline to 30 per cent by 2040. The number of older people has been growing at a fast pace, doubling in size in the 20 years since 1980. The number is projected to more than double again in another 20 years. Furthermore, another expected characteristic of the Thai population is the growth in the proportion of the oldest old, that is, those aged 80 years and older. The percentage of the oldest old has been and will be less than 1 per cent until about 2010, after which it is expected to increase to 1.8 per cent by 2025 and 3.8 per cent by 2040.

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Table 1. Key demographic estimates and projections (medium variant), 1970 to 2040

<i>Year</i>	<i>1970</i>	<i>1980</i>	<i>1990</i>	<i>2000</i>	<i>2025</i>	<i>2040</i>
Percentage aged over 60	4.9	5.2	6.4	8.4	17.2	24.6
Percentage aged over 80	0.3	0.3	0.4	0.6	1.8	3.8
Percentage aged under 25	63.6	61.0	53.4	44.2	33.6	30.0
Median age (years)	17.4	19.5	23.4	27.5	36.7	40.5
Population aged 60 or older (thousands)	1,777	2,410	3,481	5,041	12,705	19,994

Sources: United Nations (2003). *World Population Prospects: The 2002 Revision, Vol. I: Comprehensive Tables* (United Nations publication, Sales No. E.03.XIII.6); and United Nations (2003). *World Population Prospects: The 2002 Revision, Vol. II: Sex and Age* (United Nations publication, Sales No. E.03.XIII.7).

Table 2. Key demographic estimates and projections (medium variant), 1965-1970 to 2045-2050

<i>Year</i>	<i>1965-1970</i>	<i>1980-1985</i>	<i>1995-2000</i>	<i>2010-2015</i>	<i>2020-2025</i>	<i>2045-2050</i>
Total fertility rate (children per woman)	6.0	3.1	1.95	1.85	1.85	1.85
Life expectancy at birth (years)	59.1	65.0	68.1	72.9	74.8	78.2

Sources: United Nations (2003). *World Population Prospects: The 2002 Revision, Vol. I: Comprehensive Tables* (United Nations publication, Sales No. E.03.XIII.6).

This remarkable growth in the population of older persons in Thailand has resulted mainly from a rapid decline in fertility. The total fertility rate decreased from 6 children per woman in the period 1965-1970 to 3 in the period 1980-1985, down to below the replacement level in the period 1995-2000. The total fertility rate is expected to stay below the replacement level over the next 50 years. This dramatic decline in fertility is attributed mainly to the successful implementation of the National Family Planning Programme, which started in the early 1970s (Robinson and Rachapaetayakom, 1993; Rosenfield and others, 1982). The pace of population change in the country, however, did not leave enough time for Thai society to adequately adapt itself to an ageing population.

In addition to the decline in fertility, the increasing life expectancy at birth indicates that a major mortality reduction has also occurred in Thailand. The life expectancy at birth increased from less than 60 years in the period 1965-1970 to 65 years in the period 1980-1985, and then to 68 years in the period 1995-2000. The life expectancy at birth is projected to continue to increase over the next half century towards 80 years. Although the initial mortality reduction was a consequence of lowered infant mortality rates, a further mortality

decline will be achieved within the older population (Knodel and others, 1999). As an indication, the life expectancy at age 60 has been gradually increasing for younger birth cohorts. For instance, men who were born in 1915 had a remaining life expectancy of 15.7 years at age 60, while for the 1935 birth cohort, the remaining life expectancy at the same age was 17.7 years. Similarly, future older persons who had been born in 1955 would have the expectation of 19.3 years of remaining life when they turn 60 in 2015 (Prasartkul and Rakchanyaban, 2002).

The sustained ageing of the Thai population raises concerns for accommodating the needs of the growing proportion and size of the older population. One of these concerns is the health status of the ageing Thai population since older persons are usually more vulnerable to various health risks. While life expectancy implies that people are living longer lives, this does not necessarily mean that they are living longer in good health. The extended years of life could be spent with chronic diseases and functional disabilities. Thus, the crucial issue now is to examine the health status and morbidity of the Thai population beyond conventional measures of mortality.

B. Population health and its measurements

1. Conceptual framework

There has been considerable debate over the relationship between mortality and morbidity largely in Western populations. Central to the debate is the nature and quality of the extended years of life, whether people are living longer in good health or with disabilities. The emphasis on not only quantity but also quality of life is a reaction to the observed substantial increase in the size of the older population and an expression of concern over national capacities to meet the needs of this segment of the population. Here, three major components of the discussion, namely, the expansion of morbidity hypothesis, the notion of compression of morbidity and the concept of dynamic equilibrium, have been introduced.

Supporters of the expansion of morbidity hypothesis argue that as life expectancy increases the prevalence of chronic diseases and disability will also increase. According to Olshansky (1991), since the mortality rate among the young population is already quite low in the United States of America, where this argument originates, a further extension of life in the future ought to be from a reduction in deaths among the growing numbers of older people. Medical improvements can enhance the chances of survival from some fatal diseases, but it is more difficult to reverse impairments resulting from non-fatal diseases of ageing. Gruenberg (1977) also pointed out a paradox in which medical success in reducing deaths from what previously had been fatal diseases has contributed to an increase in the prevalence of chronic diseases and disabilities owing to the fact that people who would have died a century ago from such diseases are now surviving. Thus, according to this view, an extended life is more likely to be spent with disabilities because death could be avoided but the incidence of diseases and their consequential impacts cannot be eliminated.

On the contrary, a more positive view of prolonged life envisions a delay in the onset of chronic problems relative to life expectancy, described as “compression of morbidity”. According to Fries (1989), compression of morbidity entails a reduction in the amount of time spent with a disability as a result of the later onset of chronic

illnesses and a relatively unchanging length of life. By way of example, Fries argues that several intervention studies conducted in the United States have shown that health interventions such as cessation of smoking, treatment of hypertension and reduction of fat intake work more effectively in reducing the incidence of morbidity than in decreasing the number of deaths. Hence, the extended span of life could be less affected by disability as a consequence of maintaining a healthful lifestyle.

Finally, the concept of dynamic equilibrium has brought some degree of mediation between the two previous arguments. The dynamic equilibrium concept, formulated by Manton (1982), clarifies that disease prevalence is a function of incidence and duration, that is, if the frequency of the incidence of a chronic disease does not change, the only way to improve the mortality rate is by extending the duration of the disease. For chronic diseases, extending the duration of disease is possible by preventing death from complications and delaying the progression rate. For example, as in the case of hypertension, disease severity can be reduced by clinically controlling the disease, which consequently leads to a higher prevalence rate of the disease but a lower mortality rate from it. Thus, following this argument, mortality and morbidity are correlated, and the effects of chronic diseases can be medically treated, but prevalence is unavoidable with ageing.

The conceptual framework attempts to determine whether declining mortality, expressed in a longer life expectancy, leads to extra years of health or disability presents the new challenge of defining and measuring “healthy years”. As the above review implies, it becomes necessary not only to think of population health beyond life expectancy, but also to think in terms of health quality. Hence, along with the conceptual progress, there have been efforts to measure operationally the level of population health and develop summary measures of health, such as active life expectancy, disability-free life expectancy and healthy life expectancy. However, different summary measures of health relate to different aspects of health, thereby requiring varying measurements as input for their calculation (see Murray and others, 2000). Also, from a realistic point of view for countries such as Thailand, where health-related data are limited, the necessary information for highly sophisticated calculations is not easily obtainable (Jitapunkul and others, 2003a). As

an example of the data constraints, it has been found that two thirds of the reported causes of death for older persons in Thailand are listed basically as "from old age" (Jitapunkul and others, 1993). Therefore, in this study, one of the basic measures of health, that is, the activities of daily living (ADL), is used mainly to assess the current status of health among older Thais.

2. Activities of daily living measurements

The ADL measurements were originally developed as an objectively quantifiable index to monitor the functional independence of older persons and chronically ill patients. The ADL measures in their original form relate to six tasks performed in everyday life: bathing, dressing, going to the toilet, transferring (moving from one place to another), continence and feeding, with an observer recording a patient's degree of competence for each activity. An individual's total score for functional independence is summarized as a graded scale (Katz and others, 1963). These ADL measures, based on biological functions, have been found to be good predictors in assessing basic ability to maintain functional independence and are often included in surveys administered to populations of older persons and, therefore, are also used in this study.

The ADL measurements have been also used as an input for calculating one of the summary health measures, namely, active life expectancy. The notion of active life expectancy was first introduced as an alternative measure of population health to the standard life expectancy indicator (Katz and others, 1983). Active life expectancy is calculated with life table techniques, as with the case of life expectancy calculation, but instead of death as the decrement, loss of functional independence (which is measured using the ADL measurements) is used. In essence, active life expectancy measures the years of life expected to be lived with functional independence, while tapping into the idea of quality of life.

Despite its usefulness as a health indicator, problems with the ADL measurements have also been reported. Wiener and others (1990) found that the percentage of people with ADL problems varies by about 3 per cent across different large-scale community-based surveys conducted in the United States. Some sources of variation include the following: differences in the ADL tasks (since the

original set of ADLs was drawn up, different sets of ADLs have been published); the way ADLs are measured; the age composition of the people included in the surveys; and differences in data collection methods, including the sampling frame. Thus, it is important to keep in mind these issues regarding the variability of ADL measures when comparing ADL results across studies.

II. SOURCE OF DATA

The data for this study were collected by the author with the institutional cooperation of Thailand's Mahidol University from November 2003 through April 2004.¹ The target population of the project was people who resided in the Bangkok Metropolitan Area at the time of contact and who were older than 60 years of age. The sampling unit was the census blocks that are used for the Population and Housing Census of Thailand, conducted every 10 years. The National Statistical Office of Thailand provided the maps of census blocks that had been randomly selected from each of the 50 administrative districts in the Bangkok Metropolitan Area.

Upon obtaining the maps, the interview team, consisting of 2 supervisors and 10 interviewers (all of whom were Thai), and the author, first conducted an area survey and household listing. The rationale for the area survey was threefold: (a) to identify the exact location of the target census blocks; (b) to draw more detailed neighbourhood maps; and (c) to list all households located within the target census blocks, with information on the number and sex of older persons actually living in each listed household. In addition, this stage of data collection introduced the interview team members to people living in the target census blocks so that the residents would be able to recognize the interviewers during the actual interview visits at a later stage. This important step helped to "open houses" for interviews in a big city such as Bangkok.

After the initial survey stage, interviewer training on the questionnaire schedule lasted two weeks. Actual data collection was conducted over the next four months by visiting each household containing at least one person aged 60 years or

¹ This study was funded by the National Science Foundation in the United States.

older. The final number of cases obtained was 1,134, yielding an overall response rate of 62 per cent (65 per cent for mainly Thai areas and 53 per cent for predominantly Chinese-Thai areas). This rate is slightly less than that of the 2000 Housing and Population Census of Thailand, which was 69 per cent for the Central region, including the Bangkok Metropolitan Area (personal communication with the National Statistical Office, 26 August 2004).

III. HEALTH STATUS OF OLDER THAIS

A. Dimensions of health

1. Functional limitations

One of the primary concerns for an ageing society is the management of chronically ill and disabled older persons. This study first focuses on the prevalence of disabilities, as calculated by ADL measures, as well as extensions to the ADLs, which were added to measure milder functional limitations. The prevalence and major types of chronic diseases observed in the population are also discussed because chronic diseases are often linked with the older person's disability status. Whether the people of Thailand are heading for morbidity "expansion" (cf. Gruenberg, 1977) or "compression" (cf. Fries, 1989), assessing the current health status of the older population constitutes an important step towards preparing for the needs of this group in the future.

(a) Overview of functional limitations

The ADLs used in this study include a total of six daily tasks: eating food, putting on clothes, walking around the house, getting up from a bed (or the place where the respondent sleeps), taking a bath (shower) and going to the toilet. Although the basic ADLs are meant to examine the ability to maintain basic independence, they are not broad enough to cover the wider range of activities needed in everyday life. In addition to the ADLs, the extension of ADL measures, similar to the measures proposed by Nagi (1976), are included to capture milder functional limitations experienced by the respondents. Additional items include squatting, walking about 1 km, lifting an object weighing about 5 kg, climbing two to three steps and getting into a car, bus or boat. It should be noted that the above-mentioned six

ADLs and five ADL extension items were selected because they are conceptually easy to understand for both the interviewers and the older respondents and are reasonably neutral to differences in gender, socio-economic status and ethnicity. In addition, these items have also been included in other surveys conducted in Thailand such as the Survey of Elderly in Thailand 2002, all of which factors are important criteria for comparative purposes. During the interview, the respondents were asked if they were: (a) unable to perform, (b) able to perform with help, or (c) able to perform without help these six ADLs and five ADL extension activities. If the older persons answered either that they could not perform an activity at all or needed help from another person, they were classified as "not independent" in conducting that activity.

Table 3 summarizes the prevalence of functional limitations among the Thai older persons living in non-institutional households in Bangkok. The overall proportion of the older persons who have difficulty independently performing one or more activities out of all six ADL tasks (eating, dressing, bathing, toileting, getting up and walking) is 6.0 per cent. When items that concern transferring ability are excluded (that is, including only the four activities of eating, dressing, bathing, toileting), the proportion decreases to 4.0 per cent (table not shown). At a glance, the prevalence of ADL problems seems low, especially when compared with data from developed countries (for example, the rate for Japan (Tsuji and others, 1996) including the four above-mentioned activities is 7.6 per cent). However, results from the Survey of Thai Elderly 2002 reported an even lower prevalence rate (not including transferring items) of 3.1 per cent (Rakchanyaban, 2004). On the contrary, compared with the low ADL prevalence, half the older persons have at least one problem with the extension of ADL items (squatting, lifting an object weighing about 5 kg, walking about 1 km and getting into a car, bus or boat). This prevalence is also fairly similar to the finding reported in the aforementioned study. Hence, a quick view of the overall prevalence of functional limitations among older persons seems to show mixed results: a low prevalence of older persons who need intensive daily care as well as a fairly high proportion of the older persons who are independent with regard to basic personal care but whose physical functioning is not without problems in conducting a wide range of daily activities.

Table 3. Percentage of older Thais with functional limitation or chronic disease, by age and sex

	<i>Functional limitation:</i>		
	<i>with ADL problems</i>	<i>with extension of ADL problems</i>	<i>with chronic disease</i>
Age (years)			
60-69	2.7 (593)	35.9 (593)	77.9 (592)
70-79	6.9 (408)	60.8 (408)	84.5 (406)
80-89	13.7 (117)	76.9 (117)	79.3 (116)
90+	50.0 (16)	100.0 (16)	87.5 (16)
Sex			
Males	3.8 (421)	35.6 (421)	75.4 (418)
Females	7.3 (713)	58.5 (713)	83.6 (712)
All	6.0 (1,134)	50.0 (1,134)	80.5 (1,130)

Note: Figures in parentheses are the sample size.

Further examination of each activity reveals that some daily tasks are more difficult to execute than others. Table 4 shows ADL problems ordered from less to more prevalent: eating (0.9 per cent), dressing (2.8 per cent), bathing (3.2 per cent), toileting (3.9 per cent) and walking and getting up (both 4.4 per cent). As for the milder functional limitations, about 17 per cent of the older persons are unable or need help to climb steps, while a little less than one third of the older persons have difficulty walking about 1 km or getting into a car, bus or boat. In addition, about 36 per cent of the older persons reported difficulties in squatting and another 40 per cent reported problems lifting a 5-kg object. The pattern of functional limitation provides

useful information on understanding the actual problems that older persons are likely to encounter in everyday life and for planning ways to reform the physical environment to better suit the needs of these people.

(b) Age and sex

Consistent with studies from Thailand as well as Japan and the United States (Jitapunkul and others, 2003b; Liu and others, 1995; Crimmins and others, 1994), the proportion of older persons with ADLs or extension of ADL problems significantly increases with advancing age. It can also be seen from table 3 that only 2.7 per cent of people aged 60 to 69 had functional limitations with ADLs, but the figure increases to 6.9 per cent for those aged 70 to 79, to 13.7 per cent for those aged 80 to 89, and finally to 50.0 per cent for those who are aged 90 and older. The implication, however, is that at ages 80 to 89, around 14 per cent of older persons cannot take care of basic personal needs by themselves. In other words, the percentage of older persons with serious disabilities is still relatively low among older persons in Thailand, while those aged 60 to 69 and older are relatively free from disabilities.

An examination of functional limitations for a wider range of daily activities among older persons, however, suggests that advancing age does pose barriers to conducting a more active everyday life. Table 3 also shows over three quarters of people in their 80s and all those in their 90s have

Table 4. Types of functional limitations of older Thais

	<i>Frequency</i>	<i>Percentage</i>
Eating	10	0.9
Dressing	32	2.8
Bathing	37	3.2
Toileting	44	3.9
Getting up	50	4.4
Walking	50	4.4
Squatting	409	36.1
Lifting 5 kg	459	40.5
Walking 1 km	332	29.3
Climbing stairs	191	17
Getting into a car, bus or boat	328	28.9

Note: Total sample size is 1,134.

at least one problem with the extension of ADL activities. The equivalent figures for persons in their 60s and 70s are about 36 per cent and 61 per cent respectively. However, if one looks at the picture in a positive way, the comparison actually means that the majority of “younger” older persons can still manage to conduct an active daily life. In fact, the distribution of milder disabilities by age corresponds to the level of social engagement among older persons in Thailand. It can be seen from table 5 that almost 40 per cent of the older persons aged 60 to 69 are actively working, while this figure decreases to 20 per cent, 17 per cent and 6 per cent for persons in their 70s, 80s and 90 and older respectively. Moreover, more than 20 per cent of the older persons aged 60 to 79 function as a major housekeeper at home, but the percentage drops to half that for those aged 80 to 89 and to zero for those aged 90 and older.

Table 5. Percentage distribution of older Thais, by work status and age

Work status	Age group				All
	60-69	70-79	80-89	90+	
Working	39.8	20.3	16.5	6.3	30.0
Housekeeper	21.0	22.3	10.4	0.0	20.2
Retired	39.1	57.3	73.0	93.8	50.0
Sample size	591	403	115	16	1,125

With regard to the distribution of functionally limited older persons by sex, older females seem to be disadvantaged in many respects. As table 3 shows, 7.3 per cent of the females, as opposed to 3.8 per cent of the males, have a problem with at least one ADL activity. The equivalent figures for the extension of ADL problems are 58.5 per cent for females and 35.6 per cent for males. As for the incidence of chronic disease, 83.6 per cent of females and 75.4 per cent of males reported having at least one chronic disease. Supplementing these findings, another study also suggested that the proportion of active life expectancy to life expectancy is consistently lower for females than males, implying that Thai females spend a larger portion of their lives with disabilities than males (Rakchanyaban, 2004).

Furthermore, a breakdown of older persons by marital status reveals that widows have more health problems than widowers. As table 6 suggests, 9.8 per cent of widows have at least one ADL problem, while the same disability prevalence for widowers is 7.0 per cent. Similarly, only 51.2 per cent of widowers have extension of ADL problems, as opposed to 71.7 per cent of widows. This finding suggests that older females without a spouse are at a higher risk of being unhealthy. Recognizing an inevitable increase in the number of older females in Thailand (Jitapunkul, 2002), the number of unhealthy widows may also be expected to rise in the future. Thus, specific policies related to the causes of health inferiority among widows and strategies for improving their health are urgently needed.

Table 6. Percentage of older Thais with functional limitation, by marital status and sex

Marital status	Functional limitation:			
	with ADL problems		with extension of ADL problems	
	Male	Female	Male	Female
Never married	11.1	1.9	44.4	44.4
Married	2.5	5.1	32.8	50.8
Divorced	15.4	9.5	46.2	42.9
Widowed	7.0	9.8	51.2	71.7
All	3.6	7.2	35.3	58.4
Sample size	419	711	419	711

(c) Socio-economic status

Previous studies in developed countries have examined the relationship between health on one hand, and socio-economic status, on the other. Such studies have well documented the existence of inequality in health among people of different socio-economic status (Preston and Taubman, 1994; Hayward and Heron, 1999; Cambois and others, 2001). Similarly, it has been reported that education, occupation, income and household possessions are all associated with different levels of health status in Thailand (Zimmer and Amornsiririsonboon, 2001). The following analysis uses years of formal education and occupation at age 41 as indicators of socio-economic status. As many of the older per-

Table 7. Functional limitation of older Thais, by educational level

	<i>No schooling</i>	<i>Primary level</i>	<i>Secondary level</i>	<i>Post-secondary level</i>	<i>All</i>
Percentage disabled	66.7	52.7	41.1	31.8	50.0

Note: Total sample size is 1,134; functional limitation refers to disabilities measured by the extensions of ADLs.

sons have retired, occupation at age 41 is included instead of current occupation. Occupation at age 41 was selected also to help understand the cumulative impacts of certain jobs on health status in old age.

According to table 7, the percentage of older persons with functional limitations (having at least one problem with the extension of ADL items) decreases from 66.7 per cent for the older persons with no schooling, to 52.7 per cent for those older persons with primary school education, to 41.1 per cent for those with a secondary school education, and finally down to 31.8 per cent for those with post-secondary school education. When the least- and most-educated groups are compared, the prevalence rate is more than twice as high for the least educated as that of the most educated. In addition, among the older persons with functional limitations, those with a lower education (having no or only primary education) are much less likely to be “retired” than the older persons with a higher education (secondary education or higher). Over two fifths (40.8 per cent) of older persons in the former group were currently in the labour force, and another 22.5 per cent were currently primary housekeepers in their home. For the latter group, the equivalent figures are 32.5 per cent and 9.4 per cent respectively (table 8). The picture drawn here implies that the level of education defines whether a person can afford to retire regardless of disability status.

Table 8. Percentage distribution of older persons, by work status and education

<i>Work status</i>	<i>Education</i>		
	<i>Low</i>	<i>High</i>	<i>All</i>
Working	40.8	32.5	37.7
Housekeeper	22.5	9.4	17.6
Retired	36.6	58.0	44.6
All	99.9	99.9	99.9

Table 9 examines the distribution of functional limitations in old age by the type of occupation at age 41; it shows a remarkable gap in health among occupational groups. Of those with functional limitations, the healthier groups are people with professional jobs (32.0 per cent), followed by civil servants (37.2 per cent) and people who worked at a private company (39.7 per cent). On the contrary, the most health-disadvantaged groups include full-time housekeepers (64.4 per cent) and self-employed people; the latter category includes a variety of odd jobs such as street vendors (55.6 per cent) and farmers (51.8 per cent). The impacts of past occupation on current health status signify the possible cumulative health hazards occurring from the nature of the work and the work environment. Additionally, it needs to be pointed out that one of the most health-disadvantaged occupational groups, the self-employed, is the most common. Self-employed status covers a far larger part of the population (24.6 per cent) than professionals (2.2 per cent) or private company employees (6.9 per cent). Thus, rigorous policy attention should be given to those socially vulnerable people in order to reduce occupational risk factors that impose long-term health disadvantages.

2. Common chronic diseases

As discussed above, the expected increase in the prevalence of chronic diseases with the progression of population ageing is often linked to expanded disability prevalence and worsening health status. Thus, an examination of disease patterns and their distributions among the population of older persons is useful in understanding the health status of this population and in identifying areas of concern for public health policy makers.

As previously indicated, there is a surprisingly high prevalence of chronic diseases among older persons in the sample (see table 3). Overall,

Table 9. Percentage of older Thais with functional limitation, by occupation

	<i>Occupation at age 41</i>									
	<i>Professional</i>	<i>Owner of business</i>	<i>Self-employed</i>	<i>Private company</i>	<i>Other jobs</i>	<i>Farmer</i>	<i>Civil servant</i>	<i>House-keeper</i>	<i>Not employed</i>	<i>Unknown</i>
Percentage disabled	32.0	50.8	55.6	39.7	43.1	51.8	37.2	64.4	40.0	28.6
Out of total	2.2	5.4	24.6	6.9	16.7	7.6	17.0	18.5	0.4	0.6

Note: Total sample size is 1,125; functional limitation refers to disabilities measured by the extension of ADLs.

80.5 per cent of older persons reported having at least one chronic disease. Even at the younger ages of 60 to 69, 77.9 per cent of the older persons had a chronic disease and the level stays high for the advanced ages, with the highest level (87.5 per cent) being recorded for those aged 90 and older. Confirming the weaker health of older females examined previously, women were more likely to have a chronic disease (83.6 per cent) compared with men (75.4 per cent). As shown in table 10, the three most frequently mentioned types of chronic diseases are hypertension (36.2 per cent), rheumatism (32.2 per cent) and diabetes (17.9 per cent). The observed high incidence of chronic diseases calls for further investigation, especially on the severity of chronic diseases and their impacts on disability status and the resulting quality of life.

Table 10. Most common chronic diseases found among older Thais

<i>Diseases</i>	<i>Frequency</i>	<i>Percentage</i>
1. Hypertension	409	36.2
2. Rheumatism	364	32.2
3. Diabetes	202	17.9
4. Heart disease	100	8.9
5. Allergy (dust)	43	3.8
6. Bone diseases	29	2.6
7. Paralysis	26	2.3
8. Low blood pressure	22	2.1
9. Ulcer	19	1.7
10. Memory problem	16	1.4
Total	1,130	109.1

Note: Total percentage exceeds 100 as some older persons have more than one chronic disease.

Other categories of chronic diseases that cannot be overlooked are paralysis and memory-related problems. In this sample, 2.3 per cent of older persons were suffering from some kind of paralysis and another 1.4 per cent were reported to have problems related to memory. However, these figures are most likely to be underestimated because of the difficulty that had been encountered in having these older persons participate in the interviews. For example, the estimated prevalence rate of 3.4 per cent for dementia (Jitapunkul, 2001) and the remarkably high rate of 24.5 per cent for paralysis (Siripanich, 1982, cited in Jitapunkul, 1993) have been reported. Since these diseases present conditions that require particularly intensive care, more effort is needed in clarifying the current prevalence and distribution of these problems, preparing measures to prevent them and accommodating older persons with these conditions.

B. Issues of health care for older persons

1. Payer of health-care costs

Population ageing and the associated increase in the prevalence of disabling chronic diseases present many challenges for older persons, their families and society. One of the most important issues is health care, whether in terms of paying for medical services or obtaining physical care. In this section, sources of monetary as well as physical daily care for older Thais are examined.

Considering the widespread incidence of co-residence with adult children in Thailand (Wongsith and Siriboon, 1999), the overall distribution of the major payers of health-care costs for older persons shows a surprisingly higher dependence on one's self or spouse rather than on children. Table 11 shows that the major payers appear to be: (a) the

older respondent or his/her spouse (38.5 per cent); (b) children and grandchildren (26.7 per cent); (c) the Government via the reimbursement of health-care costs as a part of civil-service benefits as well as government welfare programmes, including the 30-Baht Health Care Scheme (18.6 per cent);² (d) no one, owing to the infrequency of visiting a hospital (12.1 per cent); (e) relatives and other people (2.8 per cent); and (f) unknown (1.3 per cent).

Table 11. Percentage distribution of payers of health-care costs for older Thais, by disability status

	<i>Without disability</i>	<i>With disability</i>	<i>All</i>
Self/spouse	46.5	30.3	38.5
Children	18.7	34.8	26.7
Relatives/others	1.9	3.6	2.8
Government	18.7	18.5	18.6
No one	12.7	11.5	12.0
Unknown	1.4	1.3	1.3
Total	99.9	100.0	99.9

Note: Total sample size is 1,124; disability status is measured by the extensions of ADLs.

A breakdown of this distribution by health status further suggests a consistently high level of reliance on self or spouse for paying medical costs, even for those older persons with disabilities. Despite the fact that more older persons with functional limitations (as measured by the extensions to ADLs) depend on their children (34.8 per cent) than those without any functional limitation (18.7 per cent), as many as 30 per cent of the older persons with a functional limitation still pay for health-care costs by themselves or have them paid by a spouse. An almost equal percentage of healthy and unhealthy older persons (18.6 per cent) also use the government reimbursement system or welfare programmes. Furthermore, even among older persons with functional limitations, a fairly high proportion (12.0 per cent) rarely goes to a hospital (this proportion is approximately the same for the older persons with a chronic disease as well), and this level is almost equal to that of the older persons without a disability. These findings imply that in contrast to the common notion that it is the

children who are the main source of social security for older persons, in terms of health-care payments, the actual dependence on children may not be as great as the assumption suggests. The majority of older persons take care of payments from non-child sources, including the possibility that some may refrain from regular hospital visits so as not to incur costs.

2. Provider of physical care

In contrast to the health-care payers, major physical-care providers turned out to be adult children. The main sources of everyday care were: (a) children and grandchildren (46.7 per cent); (b) spouse (23.2 per cent); (c) one's self (that is, no one) (20.8 per cent); (d) relatives and others (5.1 per cent) and (e) unknown (2.2 per cent) (table not shown). Not surprisingly, as the older persons increase in age, children provide more care, presumably as a result of an increasing need for health care and increased chance of being widowed.

The distribution of major sources of care for older persons with functional limitations shows a clear pattern of care provision depending on each person's marital status. Care provision for a married older person is evenly divided between children (42.0 per cent) and spouse (40.5 per cent). On the contrary, compensating for the unavailability of a spouse, the vast majority of widows (81.1 per cent) depended on their children, while 11.8 per cent had to depend on themselves. Compared with widows, a smaller percentage of divorcees depended on their children (63.6 per cent), with relatives and others comprising a sizable proportion of the caregivers (15.2 per cent). Finally, the majority of never-married older persons (60.7 per cent) received care from relatives and others, and 28.6 per cent took care of themselves (table 12). The heavy dependence on children and extended families for physical care raises a concern over the ability and availability of families to keep providing needed care for the ageing population in the future. In particular, given the large proportion of widows in the population, combined with reduced fertility rates for future cohorts of older persons, the sustainability of the current major reliance on children in caring for widows needs to be critically reviewed. In addition, in the light of the increasing number of Thais who never marry (Jones 2002), the situation of never-married older persons deserves more attention as they are the ones who are at the highest risk of not having a caregiver when needed.

² About 5 per cent is estimated to be paid for by the government welfare programme.

Table 12. Percentage distribution of caregivers for older Thais with functional limitations, by marital status

	<i>Marital status</i>				
	<i>Married</i>	<i>Widowed</i>	<i>Divorced</i>	<i>Never married</i>	<i>All</i>
Self/no one	11.4	11.8	18.2	28.6	12.9
Children	42.0	81.1	63.6	10.7	57.9
Relatives or others	1.1	5.3	15.2	60.7	6.7
Spouse	40.5	0.0	0.0	0.0	19.4
Unknown	5.0	1.8	3.0	0.0	3.1
Total	100.0	100.0	100.0	100.0	100.0

Note: Functional limitations are measured by the extensions of ADLs.

IV. POLICY IMPLICATIONS

The above examination of the health status of older Thais identifies key issues that need particular policy attention in order to ensure adequate quality of health in old age. First of all, at the societal level, health inequalities among older persons from different social positions need to be narrowed in order to achieve an overall improvement of health in old age, emphasizing the consequences of past occupation on current health. It must also be noted that health status and the resulting quality of life are not just products of “old age”, but of life-long consequences; as such, improving the quality of life throughout life is crucial. In fact, this life-course perspective has been incorporated into the Second National Long-term Plan for Older Persons 2002-2021, suggesting the importance of the preparation for old age, with emphasis on individual responsibility for achieving this end (Jitapunkul, 2002). However, for the majority of people in disadvantaged positions, it is difficult to prepare sufficiently for old age by individual effort alone unless issues such as job security, basic conditions in the work environment and work-associated entitlements and disadvantages are improved. Ethnographic data from this project reveal a pattern of poverty in which life-long economic insecurity carries over into old age, and in which older persons are struggling not only to take care of themselves and get by with less than perfect health, but also to support their offspring. For these older persons, “preparation for the future” has been beyond their means. Thus, at the national policy level, measures to help to improve work conditions, especially for day-to-day self-employed people, should be considered for long-term positive health outcomes.

Second, relating to the aforementioned argument about the relationship between mortality and disability, the Government needs to balance its emphasis between a further extension of life expectancy and the improvement of health quality within the current life expectancy. A study using a cause-elimination life table suggests that eliminating fatal diseases such as cancer and circulatory-related diseases results in a greater extension of life expectancy but with longer duration of hospital stay. On the contrary, elimination of injuries, mental disorders and other non-fatal chronic diseases produce a minimal increase in life expectancy with significantly shortened hospital stays (Millar and Hill, 1995). The life-table simulation presents the issue of priority: if the major target of public policy is to improve the quality of life of the surviving population, prevention measures for non-fatal but disabling chronic diseases would be more effective. To this end, in addition to easily accessible good quality health care, the promotion of public awareness of the causes, consequences and preventive methods of major chronic diseases and health risks for older persons should be given priority.

Third, in order to encourage the social participation of older persons and to lessen the physical burden of the older persons with differing degrees of functional limitations, various modifications to the physical environment are needed in the public domain. This study found that a significant proportion of the older persons with functional limitations are in the labour force and another large portion of them shoulder the responsibility of running a household. Modifying the physical environment by removing unnecessary steps and gaps on the streets and lowering the steps on public buses,

among others, would be useful for the maintenance of active lives with manageable levels of functional limitations. Moreover, given the noticeable size of the older population with rheumatism, paralysis and memory problems, facilities to provide rehabilitation and support are necessary to improve the quality of life for the older persons with these long-term problems. Currently, these facilities are scarce. Further, the concept of long-term care is not well developed in Thailand (Jitapunkul, 2002). Also, extending attention to this group of older persons would in turn help to ease the burden of caring for them solely in familial settings.

Fourth, from the previous examination, widows and never-married older persons emerge as particularly important categories of the population of older persons who require more policy attention. Since widows are the ones who have been identified as being less healthy and whose number in the population is inevitably increasing, measures targeting their health improvement should be given importance. Alternatives to the current heavy reliance on children as caregivers also need to be explored soon. Although it is crucial for a country such as Thailand to depend on adult children for old-age care, it is also important not to over-estimate the capability of families to continue providing security for older persons, particularly for the long-living disabled older persons. Furthermore, strategies to provide health care for the never-married older persons need to be prepared because this population group comprises the ones who are most likely to be left without a source of care when their deteriorating health condition requires it. Although the proportion of never-married older persons is currently still small, the data in this study suggest a high proportion of never-married adult children (that is, children of the older subjects) aged 30 years and older. Thus, specific plans to secure physical care for never-married older persons deserve serious consideration before this higher proportion of never-married people reaches old age.

Finally, for the purpose of well-informed policy-making, further data collection with comparable time and place measurements is of paramount importance. Currently, there are variations in the way health measurements are operationally applied in different research. For example, in even a seemingly simple application of ADLs, the wording in the questionnaire, the exact number of ADLs and

the specific items included, along with the degree of “dependence” falling under the category of “functionally limited”, is not always the same across studies. As such, direct comparisons of health status across time and place are extremely difficult and may also result in misleading policy implications. In particular, as ADLs are often used to calculate a summary measure of health, such as active life expectancy, a reduction of relativity in ADLs is urgent for policy makers. Thus, in order to enhance the intended usefulness of ADLs as a basic measurement of disability status, the reliability of the measurement needs to be further improved by operationally standardizing its use. Furthermore, when ADLs are applied to populations with different cultures, it is important to balance country-wide standardization with culture-specific factors to avoid measurement errors resulting from different cultural concepts about health and disability (cf. Ikels, 1991). In addition, standardizing measurements is crucial for the meaningful implementation of much-needed longitudinal studies in order to adequately follow trends and changes in the health status of a population over time.

V. CONCLUSIONS

The above analysis assessed the current health condition of older Thais living in Bangkok and identified several areas that require further policy attention. The general picture emerging from this analysis is that the proportion of older persons who require intensive daily personal care is low, while about half the older persons have at least one moderate functional limitation. Also, the prevalence of chronic diseases appears to be high, covering more than three quarters of the older population. Even though moderate disabilities are common, the majority of older persons still participate in active life, as shown in the labour-force engagement rate.

However, a particular concern is that there is a marked health gap between groups. Less healthy ones are those who are usually in more disadvantaged positions: older rather than younger, females rather than males, widows rather than those married and the less-educated rather than the more-educated older persons. Moreover, it is shown that a significant proportion of older persons with health problems pay for medical bills by themselves. On the contrary, for physical care, a heavy reliance on families and extended families is common. Consid-

ering the increase in the number of widows that will occur in the future, the sustainability of the familial system needs further investigation. Hence, policy implications should include reducing health disparities among groups, developing measures to prevent and ameliorate the consequences of chronic diseases, and modifying the physical environment to support social participation by older persons. Fi-

nally, widows should receive more policy attention as they are less healthy and their proportion is dominant in the older population. Also, never-married older persons will constitute a most needy segment in the next cohort of older persons. More data, especially longitudinal data with comparable and reliable measurements, are needed for further investigation.

References

- Cambois, Emmanuelle, Jean-Marie Robine and Mark D. Hayward (2001). "Social inequalities in disability-free life expectancy in the French male population, 1980-1991", *Demography*, vol. 38, No. 4, pp. 513-524.
- Crimmins, Eileen M., Mark D. Hayward and Yasuhiko Saito (1994). "Changing mortality and morbidity rates and the health status and life expectancy of the older population", *Demography*, vol. 31, No. 1, pp.159-175.
- Fries, James F. (1989). "The compression of morbidity: Near or far?", *The Milbank Quarterly*, vol. 67, No. 2, pp. 208-232.
- Gruenberg, Ernest M. (1977). "The failures of success", *Milbank Memorial Fund Quarterly/Health and Society*, vol. 55, No. 1, pp. 3-24.
- Hayward, Mark and Melonie Heron (1999). "Racial inequality in active life among adult Americans", *Demography*, vol. 36, No. 1, pp. 77-91.
- Hayward, Mark and Zhenmei Zhang (2001). "Demography of aging: A century of global change", in R. Binstock and L. George, eds., *Handbook of Aging and the Social Sciences* (San Diego, Academic Press), pp. 70-85.
- Ikels, Charlotte (1991). "Aging and disability in China: Cultural issues in measurement and interpretation", *Social Science and Medicine*, vol. 32, No. 6, pp. 649-665.
- Jitapunkul, Sutthicahi, Srichitra Bunnag and Shah Ebrahim (1993). "Health care for elderly people in developing countries: A case study of Thailand", *Age and Ageing*, No. 22, pp. 377-381.
- Jitapunkul, Sutthicahi, Chaiyos Kunanusont, Wiput Phoolcharoen and Paibul Suriyawongpaisal (2001). "Prevalence estimation of dementia among Thai elderly: A national survey", *Journal of the Medical Association of Thailand*, vol. 84, No. 4, pp. 461-467.
- Jitapunkul, Sutthicahi, Napaporn Chayovan and Jiraporn Kespichayawattana (2002). "National policies on ageing and long-term care provision for older persons in Thailand", in D. Phillips and A. Chan, eds., *Ageing and Long-Term Care: National Policies in the Asia-Pacific* <http://web.ibrc.ca/en/ev-28478-201-1-DO_TOPIC.html>.
- Jitapunkul, Sutthicahi, Chaiyos Kunanusont, Wiput Phoolcharoen, Paibul Suriyawongpaisal and Shah Ebrahim (2003a). "Determining public health priorities for an ageing population: The value of a disability survey", *Southeast Asian Journal of Tropical Medicine and Public Health*, vol. 34, No. 4, pp. 929-936.
- Jitapunkul, Sutthicahi, Chaiyos Kunanusont, Wiput Phoolcharoen, Paibul Suriyawongpaisal and Shah Ebrahim (2003b). "Disability-free life expectancy of elderly people in a population undergoing demographic and epidemiologic transition", *Age and Ageing*, No. 32 pp. 401-405.
- Jones, Gavin W. (1993). "Consequences of rapid fertility decline for old-age security", in R. Leete and I. Alam, eds., *The Revolution in Asian Fertility: Dimensions, Causes, and Implications* (Oxford, Clarendon Press), pp. 275-295.
- Jones, Gavin W. (2002). "The 'flight from marriage' in South-East Asia", paper presented at Regional Population Conference on South-east Asia's Population in a Changing Asian Context, Bangkok, 10-12 June.
- Katz, Sidney, Amasa B. Ford, Roland W. Moskowitz, Beverly A. Jackson and Marjorie W. Jaffe (1963). "Studies of illness in the aged: The index of ADL: a standardized measure of biological and psychosocial function", *Journal of the American Medical Association*, vol. 185, No. 12, pp. 914-919.
- Katz, Sidney, Laurence G. Branch, Michael Branson, Joseph Papsidero, John Beck and David Greer (1983). "Active life expectancy", *The New England Journal of Medicine*, vol. 309, No. 20, pp. 1218-1224.

- Knodel, John, Napaporn Chayovan, Siriwan Graiurapong and Chutima Suraratdecha (1999). *Aging in Thailand: An Overview of Formal and Informal Support*, Comparative Study of the Elderly in Asia, Research Reports No. 99-53 (Ann Arbor, Michigan, PSC Publications, University of Michigan).
- Liu, Xian, Jersey Liang, Naoko Muramatsu and Hidehiro Sugisawa (1995). "Transitions in functional status and active life expectancy among older people in Japan", *Journal of Gerontology: Social Sciences*, 50B, No. 6, pp. S383-S394.
- Manton, Kenneth (1982). "Changing concepts of morbidity and mortality in the elderly population", *Milbank Memorial Fund Quarterly/Health and Society*, vol. 60, No. 2, pp. 183-244.
- Martin, Linda G. (1988). "The aging of Asia", *Journal of Gerontology: Social Sciences*, vol. 43, No. 4, pp. S99-S113.
- Millar, Wayne J. and Gerry B. Hill (1995). "The elimination of diseases: a mixed blessing", *Health Reports*, vol. 7, No. 3, pp. 7-13.
- Murray, Christopher J.L., Joshua A. Salomon and Colin Mathers (2000). "A critical examination of summary measures of population health", *Bulletin of the World Health Organization*, vol. 78, No. 8, pp. 981-994.
- Nagi, Saad (1976). "An epidemiology of disability among adults in the United States", *Milbank Memorial Fund Quarterly*, vol. 54, pp. 439-468.
- Olshansky, Jay S., Mark A. Rudmerg, Bruce A. Carnes, Christine K. Cassei and Jacob A. Brody (1991). "Trading off longer life for worsening health: The expansion of morbidity hypothesis", *Journal of Aging and Health*, vol. 3, No. 2, pp. 194-216.
- Prasartkul, Pramote and Uthaitip Rakchanyaban (2002). *Estimated Generation Life Tables for Thailand of Five-Year Birth Cohorts: 1900-2000*, IPSR Publication No. 261 (Bangkok, Mahidol University).
- Preston, Samuel H. and Paul Taubman (1994). "Socioeconomic differences in adult mortality and health status", in L.G. Martin and S.H. Preston, eds., *Demography of Aging* (Washington DC, National Academy Press), pp. 279-318.
- Rakchanyaban, Uthaitip (2004). "Active life expectancy among the Thai elderly population", unpublished dissertation, Bangkok, Mahidol University.
- Robinson, Warren C. and Jawalaksana Rachapaetayakom (1993). "The role of government planning in Thailand's fertility decline", in R. Leete and I. Alam, eds., *The Revolution in Asian Fertility: Dimensions, Causes, and Implications* (Oxford, Clarendon Press), pp. 54-66.
- Rosenfield, Allan, Anthony Bennett, Somsak Varakamin and Donald Lauro (1982). "Thailand's family planning program: An Asian success story", *International Family Planning Perspectives*, vol. 8, No. 2, pp. 43-51.
- Seeman, Teresa E., Peter A. Charpentier, Lisa F. Berkman, Mary E. Tinetti, Jack M. Guralnik, Marilyn Albert, Dan Blazer and John W. Rowe (1994). "Predicting changes in physical performance in a high-functioning elderly cohort: MacArthur studies of successful aging", *Journal of Gerontology: Medical Sciences*, vol. 49, No. 3, pp. M97-M108.
- Tsuji, Ichiro, Yuko Minami, Akira Fukao, Shigeru Hisamichi, Hirotake Asano and Makito Sato (1995). "Active life expectancy among elderly Japanese", *The Journal of Gerontology Medical Science*, vol. 50A, No. 3, pp. M173-176.
- United Nations (2003a). *World Population Prospects: The 2002 Revision, Volume I, Comprehensive Tables* (United Nations publication, Sales No. E.03.XIII.6).
- United Nations (2003b). *World Population Prospects: The 2002 Revision, Volume II, Sex and Age* (United Nations publication, Sales No. E.03.XIII.7).

- Wiener, Joshua M., Raymond J. Hanley, Robert Clark and Joan F. Van Nostrand (1990). "Measuring the activities of daily living: Comparisons across national surveys", *Journal of Gerontology: Social Sciences*, vol. 45, No. 6, pp. S229-237.
- Wongsith, Malinee and Siriwan Siriboon (1999). "Household structure and care for the elderly in Thailand", in *The Family and Older Persons in China, Indonesia, and Thailand*, Asian Population Studies Series No. 152 (Bangkok, Economic and Social Commission for Asia and the Pacific), pp. 97-152.
- Zimmer, Zachary and Pattama Amornsirisomboon (2001). "Socioeconomic status and health among older adults in Thailand: An examination using multiple indicators", *Social Science and Medicine*, vol. 52, pp. 1297-1311.



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